



GOVERNMENT OF INDIA
MINISTRY OF TOURISM & CIVIL AVIATION
COMMISSION OF RAILWAY SAFETY

REPORT
ON
**THE WORKING OF THE
COMMISSION OF RAILWAY SAFETY**
FOR
1978—1979

BY
CHIEF COMMISSIONER OF RAILWAY SAFETY
LUCKNOW—(U.P.)



GOVERNMENT OF INDIA
MINISTRY OF TOURISM & CIVIL AVIATION
COMMISSION OF RAILWAY SAFETY

REPORT

ON

THE WORKING OF THE
COMMISSION OF RAILWAY SAFETY

FOR

1978—1979

सत्यमेव जयते

BY

CHIEF COMMISSIONER OF RAILWAY SAFETY
LUCKNOW—(U.P.)

CONTENTS

CHAPTER		Page No.
I. FUNCTIONS AND ORGANISATION OF THE COMMISSION		
1.1	Brief History	1
1.2	Functions	1
1.3	Creation of Additional Circles & Technical Wing	3
1.4	The Cadre and the Personnel	3
1.5	Jurisdiction	4
1.6	Designations of Officers	4
II. INSPECTION AND OTHER FIELD DUTIES		
2.1	Inspection of New Lines	5
2.2	New Minor Works Sanctioned	5
2.3	Works Involving Infringements of Standard Dimensions	5
2.4	Movement of Over Dimensional Consignments	5
2.5	Periodic Inspections	5
2.6	New types of Locomotives and Rolling Stock recommended/sanctioned	5
III. INVESTIGATION INTO ACCIDENTS		
3.1	Incidence of all accidents in 1978-79 and comparison with previous years	6
3.2	General Regulations for inquiries into accidents	6
3.3	Scope of statutory inquiries	6
3.4	Procedure for holding inquiries	6
3.5	Statutory inquiries into accidents held in 1978-79	6
3.6	Incidence of serious accidents inquired into during the period 1968-69 to 1978-79	19
3.7	Accidents inquired into by Railway Administrations	19
IV. MAINTENANCE OF RAILWAY ASSETS AND OPERATION		
Preliminary	20	
Formation	20	
Curves	20	
Track maintenance	21	
Points and crossings	21	
General	22	
Level Crossings	23	
Bridges	23	
Signalling	24	
Operation	26	
Locomotives and Rolling Stock	27	
Measures for dealing with accidents	28	
V. GENERAL REMARKS ON SAFETY ASPECTS		
5.1	Upkeep of speedometers and speed recorders in locomotives	29
5.2	Overloading of wagons	29
5.3	Vacancies in operating Cadre	30
5.4	Wheel and axle failures of Rolling Stock	31

APPENDICES

Appendix A-1—List of New Railway Lines, Doublings, Diversions etc. inspected and authorised during 1978-79.

Appendix A-2—List of Locomotives and Rolling Stock Recommended/Sanctioned.

Appendix B.—List of accidents inquired into by officers of the Commission of Railway Safety.

Appendix B-1—List of accidents entrusted to Railway administrations for enquiry under Rule 2(5) of the Statutory Rules.

Appendix C.—Comparative position of serious accidents inquired into by the Commission during 1978-79 and the previous 10 years—number of inquiries, casualties and cost of damage.

Appendix D.—Comparative position of serious accidents inquired into by the Commission in 1978-79 and the previous 10 years—under main categories.

Appendix E.—Summary of accidents falling under section 83 of Indian Railways Act., in which inquiry was conducted by Railway Administrations during 1978-79—category-wise and Railwaywise.

Appendix F.—Synopsis of some selected important cases of accidents under section 83 of Indian Railways Act.

Appendix G.—Comparative position of accidents under section 83—category-wise and Railway wise for the last four years.

Appendix H.—List of Accidents under section 83 involving wheel and axle defects.



CHAPTER I

FUNCTIONS AND ORGANISATION OF THE COMMISSION

Brief History

1.1 (a) To exercise effective control over the construction and operation of the first railways in India, which were entrusted to private companies incorporated in United Kingdom, Consulting Engineers were appointed under the Government of India. Later, when the Government undertook the construction of railways, the Consulting Engineers were designated as Government Inspectors. In 1883, their position was statutorily recognised. Two decades later, the Government Railway Inspectorate so called, was placed under the Railway Board which was established in 1903.

(b) Under the Indian Railway Board Act, 1905 and Notification No. 801, dated 24th March, 1905 of the Department of Commerce and Industry, the Railway Board is vested with powers and functions of the Central Government under various sections of the Indian Railways Act, 1890, in respect of all Railways in India and is authorised to make General Rules for the operation of Railways. The Railway Board is, thus the Safety Controlling Authority for the working and operation of Government and Company-managed railways.

(c) Section 181(3) of the Government of India Act of 1935 provided that "functions for securing the safety, both of the members of public and persons operating the railways including holding of inquiries into the causes of accidents should be entrusted to officers independent of the Federal Railway Authority."

To avoid direct subordination of the Railway Inspectorate to the Railway Board, the Pacific Locomotive Committee, headed by Lt. Col. A. H. L. Mount, then Chief Inspecting Officer of the British Railways, suggested in para 210 of their report of 1939:

"We understand that, under the Govt. of India Act, 1935 it is contemplated that the Inspectorate will be separated from the control of the Railway Board. This is very desirable in so far as it will eradicate the present anomaly of the Board being the Inspecting as well as the Executive Authority. We were informed that the Board fully appreciate the position, and would welcome the change, although it appears that, in practice, Government Inspectors have generally retained freedom of judgment.....".

The principle of separation of the Railway Inspectorate from the Railway Board was

endorsed in 1940 by the Central Legislature which recommended that "Senior Government Inspectors of Railways should be placed under the administrative control of some authority of the Government of India other than the Railway Board". Accordingly, the Railway Inspectorate was placed under the administrative control of the Department of Posts & Air, thereafter under the Ministry of Transport and Communications. The Administrative control over the Railway Inspectorate, which was redesignated as the Commission of Railway Safety on 1st August 1966, is exercised by the Ministry of Tourism & Civil Aviation since May, 1967.

(d) The responsibility for safety in the working and operation of Railways rests solely with the Railway Board and the Zonal Railway Authorities. The main task of the Commission of Railway Safety is to assist the Railway executives with a view to ensure that all reasonable precautions are taken in regard to safety of train operation. The Railway Board refers to the Commission matters relating to modification or enhancement of standards in respect of operation of trains, track, locomotives, rolling stock and signalling embodied in the General Rules, Rules for opening of New Lines, Manuals, IRCA Regulations, Schedules of Dimensions and other publications. Suggestions made by the Commission of Railway Safety are duly considered by the Railway Board before necessary revisions are notified.

Functions

1.2 (A) The principal functions of the Commission and Railway Safety are:—

- (i) Inspection of new Railway Lines prior to authorisation for passenger traffic.
- (ii) Periodical Inspections of Open Lines.
- (iii) Approval of new works and renewals affecting passenger carrying lines.
- (iv) Investigations into accidents, including inquiries into such accidents to passenger trains as are considered to be of a serious nature.
- (v) General advice on matters concerning safety of train operation.

(B) Statutory powers of the officers of the Commission of Railway Safety, and facilities to be afforded by Railways are specified in Sections

4 to 6 of the Indian Railways Act, reproduced below:—

"Section 4: (1) The Central Government may appoint persons by name or by virtue of their office, to be Inspectors of Railways.

(2) The duties of an Inspector of Railways shall be:—

- (a) to inspect railways with a view to determine whether they are fit to be opened for the public carriage of passengers, and to report thereon to the Central Government as required by this Act;
- (b) to make such periodical or other inspections of any railway or of any rolling stock used thereon as the Central Government may direct;
- (c) to make inquiry under this Act into the cause of any accident on a Railway;
- (d) to perform such other duties as are imposed on him by this Act or any other enactment for the time being in force relating to Railways.

Section 5: An Inspector shall, for the purpose of any of the duties which he is required or authorised to perform under this Act, be deemed to be a public servant within the meaning of the IPC (45 of 1860) and, subject to the control of the Central Government, shall for that purpose have the following powers namely:—

- (a) to enter upon and inspect any railway or any rolling stock used thereon;
- (b) by an order in writing under his hand addressed to the Railway administration, to require the attendance before him of any railway servant, and to require answers or returns to such inquiries as he thinks fit to make from such railway servant or from the Railway Administration;
- (c) to require the production of any book or documents belonging to or in the possession or control of any railway administration (except a communication between a railway company and its legal advisers) which it appears to him to be necessary to inspect.

Section 6: A Railway Administration shall afford to the Inspector all reasonable facilities for performing the duties and exercising the powers imposed and conferred upon him by this Act."

(C) The duties under sections 4(2)(a) & 4(2)(b) of the Indian Railways Act have been

detailed in succeeding Sections 17 to 20, 22 to 24. These are:—

- (i) to sanction the opening of new railway lines after inspection on behalf of the Central Government;
- (ii) to inspect a railway or a part of it and submit a detailed inspection report to the Central Government;
- (iii) to sanction the execution of all works, including new works, affecting the safety of running lines;
- (iv) to report to the Central Government any condition which may endanger the safety of travelling public and make recommendations;
- (v) to inspect a closed railway prior to its re-opening.

(D) Functional duties, including field inspections, of an Inspector of Railways, since designated as Additional Commissioner of Railway Safety, are amplified among other technical publications, in the:

- (i) General Rules for all open lines of Railways in India administered by the Government.
- (ii) Rules for opening of a Railway or Section of a Railway for the public carriage of passengers;
- (iii) Indian Railway Code of practice for Engineering Works;
- (iv) Indian Railways Way & Works and Signal Engineering Manuals;
- (v) Schedules of Dimensions;
- (vi) Indian Railways Conference Association Regulations;
- (vii) Statutory Investigation into Railway Accidents Rules, 1973.

The Additional Commissioner of Railway Safety is thus responsible for the day to day sanctions he accords to works affecting the safety of the running road, for dispensations agreed to under "approved special instructions" after due examination of each application, and for detailed Reports of Inspections of Open Line Sections, of New Lines, Conversions, Sections doubled, trebled or quadrupled, of Electric Traction and so on.

(E) After its separation from the Railway Board in May, 1941 a post of Chief Government Inspector of Railways, later designated as Commissioner of Railway Safety, was created to enable the Ministry, under which the Railway Inspectorate was placed to exercise "effective technical control".

The Commissioner of Railway Safety directs the technical activities of the Organisation and

is responsible for advising the Controlling Ministry in matters relating to recruitment of officers, postings and promotions, budget and expenditure, etc. The Commissioner deals principally with :—

- (i) Matters appertinent to Field Inspections and statutory inquiries into accidents;
- (ii) Inspection Reports of Additional Commissioners of Railway Safety;
- (iii) Reports of statutory inquiries held into Accidents by the Additional Commissioners. After careful study he forwards his considered opinion to the Controlling Ministry and the Railway Board with such recommendations as he feels are necessary;
- (iv) Railway Board's suggestions pertaining to corrections or amendments to General Rules, Rules for Opening of a Railway, Schedules of Dimensions, the Way and Works and Signal Engineering Manuals, procedures for inquiries into accidents, codes of practice and other publications;
- (v) Preparation of Annual Report on the working of the Commission of Railway Safety;

Field duties of the Commissioner of Railway Safety consist of inspections of sections of Railways, visits to the Railway Headquarters and Divisional Offices, Railway installations and Circle Offices. If considered necessary he holds inquiries into accidents of an important nature.

Creation of Additional Circles and the Technical Wing

1.3 (a) Prior to February, 1960, the organisation consisted of 4 circles—Northern, Eastern, Southern and Western. On account of development works under the Five year plans, the work load increased very considerably, specially in the Eastern Circle which included the Eastern, South Eastern and North East Frontier Railways aggregating to 14,465 route kilometres. An additional circle known as 'Construction Circle' was, therefore, created on 1-3-60 based at Calcutta, to deal with major projects, the electrification on the Eastern and South-Eastern Railways and the new DandaKaranya-Bolangir-Kiriburu Railway construction.

(b) On account of considerable increase in work load, the Circles were re-organised from 11th April 1968. With this re-organisation of the jurisdictions, the Construction Circle was renamed as South Eastern Circle and Eastern as North Eastern Circle both headquartered at Calcutta.

Pursuant to the recommendations of the Railway Accidents Inquiry Committee, 1968, two more circles of Inspection called the Central Circle and North Eastern Circle, located at Bom-bay and Gorakhpur respectively, were created in 1972. The Central circle started functioning w.e.f.

2nd February 1973, and the North Eastern Circle from 21st April, 1973. The erstwhile North Eastern Circle headquartered at Calcutta was renamed as Eastern Circle.

(c) Pursuant to the recommendations of the Railway Accidents Committee 1962, a "Technical Wing" was set up—

".....to help the Commissioner of Railway Safety and the Additional Commissioners of Railway Safety to carry out.....inspections and 'Audit checks on the quality and standard of maintenance of locomotives, rolling stock, state of equipment, safety aspects of actual practices followed by railways and observance of rules and regulations affecting the safe operation of railways."

Four posts of Deputy Commissioners of Railway Safety drawn each from Signal & Telecommunication, Electrical Traction, Mechanical Engineering and Operating Departments of the Railways were accordingly created.

The Cadre and the personnel

1.4 (a) The functions detailed in para 1.2 are carried out on the Indian Railways by a small cadre comprising the Commissioner of Railway Safety (hereinafter referred to as C.R.S. and seven circle officers, each known as Additional Commissioner of Railway Safety (hereinafter referred to as A.C.R.S.).

The C.R.S. as the Head of the Organisation is the Principal Technical Adviser to the Government in all matters pertaining to the Commission of Railway Safety. He is assisted by a Deputy Commissioner of Railway Safety (General) who also acts as the Leave Reserve Officer for Additional Commissions of Railway Safety. The C.R.S. has also the assistance of the Deputy Commissioners of the Technical Wing.

(b) As on 31st March, 1979, the cadre in the Commission of Railway was:

C.R.S.	Vacant. (Current charge held by Shri B. J. J. Rao, A.C.R.S. Central Circle).
----------------	---

A. C. R. S.] Central Circle, Bombay.	Shri B. J. J. Rao, B.E.
Western Circle, Bombay	Shri P. M. N. Murthy, B. Sc. (Hons.) B.E., F.I. E. (Ind.) M. Inst. R. T. (Ind.), Found Fel. Inst. P.W.E. (Ind.), M. ASCE.

Southern Circle, Ban-	Shri R. P. Sestry, B.E. galore.
-----------------------	------------------------------------

South Eastern Circle, Calcutta.	Shri A. A. Rego, B.E.
------------------------------------	-----------------------

Northern Circle, Luck- now.	Shri Suresh Chandra, B. Sc., B.E. (Hons.) M. Inst. R. T. (Ind.) Member Ins. of P.W.E. (Ind.)
--------------------------------	---

Eastern Circle, Calcutta.	Shri K. Ganapati, B.E.
North-Eastern Circle, Gorakhpur.	Vacant (Additional charge held by Shri Suresh Chandra, A.C. R.S. Northern Circle).
Dy. C.R.S. (General)	Vacant.
<i>Technical Wing</i>	
<i>Dy. C.R.S.</i>	
Signalling & Telecommunication (S&T)	Vacant.
Electrical Traction (ET)	Shri K. Bhojraj, B.E.
Mechanical (M)	Shri D. N. Dutt Chaudhuri B.E.
Operating (O)	Shri F. J. Correya, B.A., M. Inst. R.T. (Ind.).

Jurisdiction

1.5 The route kilometrage in the jurisdiction of each Circle, on 31st March, 1979 was as under:

Name of Circle	Head quarters	Route Kilometrage	Principal Railway	1	2	3	4
Western	Bombay	10,339	Western Railway				
Central	Bombay	6,692	Central Railway.				

1	2	3	4
Eastern	Calcutta	4,318	Eastern Railway.
South Eastern	Calcutta	7,006	South Eastern Railway.
Northern	Lucknow	10,846	Northern Rly.
North Eastern	Gorakhpur	8,741	(i) North Eastern Railway. (ii) North East Frontier Railway
Southern	Bangalore	12,981	(i) Southern Rly. (ii) South Central Railway.

NOTE.—In addition to the above principal Railway the A.Cs. R.S. exercise jurisdiction over the various Metropolitan Transport Projects, Company and Port Trust Railways located within their Circles.

Designation of Officers

1.6 The designations of the officers of the Commission have been revised w.e.f. 21-5-1979 as under:

Name of Officer	Revised Designation	Abbreviation
Commissioner of Railway Safety (C.R.S.)	Chief Commissioner of Railway Safety.	C.C.R.S.
Additional Commissioner of Railway Safety (A.C.R.S.)	Commissioner of Railway Safety.	C.R.S.



CHAPTER II

INSPECTION AND OTHER FIELD DUTIES

Inspection of New Lines

2.1 (a) The duties of an ACRS pertaining to the inspection of new railway lines including diversions prior to their being commissioned for passenger traffic, to the use of locomotives and rolling stock, and to electrification of lines are contained in the 'Rules for the Opening of a Railway or Section of Railway for the Public Carriage of Passengers'. Vide Railway Board's Notification No. 152-p of 1916, the ACRS exercises the powers under sections 18 and 19 of the Indian Railways Act (IX) 1890, for authorising such new works for traffic.

(b) With regard to the inspection of new lines, doublings, conversions, electrifications and major works, it would be unreasonable to assume that the ACRS, by mere inspection of such works, can take upon himself, any part of the responsibility which rests squarely on the engineers who have supervised the progress of these works from day-to-day during the period of construction. At the time of inspection by an ACRS, defects if any as noticed, are pointed out and remedial measures suggested.

(c) During the year under review, the ACsRS carried out detailed inspection of new works to the extent below and authorised their opening for passenger traffic.

	Kilometres
(i) New Lines	118.58
(ii) Doubling of Sections	44.583
(iii) Diversions (both permanent and temporary)	1.95
(iv) Conversion from metre to broad gauge	5.5

Particulars of the above are contained in Appendix A.

New minor works sanctioned

2.2 Additional Commissioners of Railway Safety are empowered to sanction new minor works affecting the running lines such as provision of new bridges, re-building or re-girdering of existing bridges, re-modelling of station yards, re-signalling works, alterations, or renewals and other line capacity works which affect the operation of passenger carrying traffic. These works after being sanctioned are executed by the railway officers and opened under a safety certificate issued by them unless the ACRS decides to inspect them before they are commissioned.

During the year, the ACsRS sanctioned 2402 new minor works of the above type.

Works involving infringements of standard dimensions

2.3 On the recommendation of the Commission of Railway Safety the Railway Board sanctioned 21 works involving infringements to Standard Dimensions specified in the Schedules for Broad, Metre and Narrow Gauges. Of these 2 infringements were sanctioned as a temporary measures and 19 as permanent measure.

Movement of over-dimensional consignments

2.4 Various types of heavy machinery, which infringed maximum moving dimensions, were transported on the Railways, many of them from or to the sea-port. During the year, transport of 330 over-dimensional consignments was sanctioned on railways by Additional Commissioners of Railway Safety after due scrutiny, subject to such conditions or speed restrictions as were deemed necessary.

Periodic inspections

2.5 During the year, the ACsRS carried out the statutory inspection of two company railways and one Port Trust railway aggregating to 106.11 kms., periodical inspection of 2984.64 kms. of Government Railways in company with the General Managers & 673.52 kms. of detailed inspections with other Railway officers. In addition, they carried out tour inspections of Government Railways to the extent of 12.418 kms. They submitted reports of their inspections to the Commissioner of Railway Safety who in turn forwarded them to the Railway Board for appropriate action. Significant defects noticed during the inspections were discussed at site with the railway officers concerned and copies of inspection reports were also furnished to the General Managers to ensure prompt remedial measures.

New types of locomotives and rolling stock recommended/sanctioned

2.6 On the recommendations made by the Commission of Railway safety, the Railway Board accorded sanction to the running of 21 new types of locomotives and rolling stock during the year under review, including the operation of such locomotives and rolling stock on other routes as were already in use on certain sections of the Indian Railways. The ACsRS under their own powers authorised the running of 58 types of locomotives and rolling stock on the Railways in their jurisdictions over those portions where they were not in operation till then. The locos and rolling stock recommended/sanctioned are listed in Appendix A-2.

CHAPTER III

INVESTIGATION INTO ACCIDENTS

Incidence of Accidents

3.1 (a) The number of accidents which occurred in 1978-79 as advised by the Railway Board on the Government Railways including those reported under section 83 of the Indian Railways Act, 1890, are given in the table below :—

Sl. No.	Railways	No. of Accidents		No. of accidents under section 83 of the Indian Railways Act	
		77-78	78-79	77-78	78-79
1	2	3	4	5	6
<i>Government Railways</i>					
1. Central . .	2,366	2,390	58	76	
2. Eastern . .	937	1,022	31	33	
3. Northern . .	1,167	1,107	57	54	

	1	2	3	4	5	6
4. North Eastern .	479	477	30	50		
5. North East Frontier	207	256	51	58		
6. Southern . .	554	532	43	37		
7. South Central .	469	736	48	44		
8. South Eastern .	3,384	2,985	66	62		
9. Western	887	1,066	71	50		
			10,450	10,571	455	464

The figures in the table do not include such occurrences as persons falling out from trains, persons run over on lines and injuries to station or line staff.

(b) For the period from 1968-69 to 1977-78 and for the year 1978-79, the incidence of train accidents on Government Managed Railways including those under section 83 is shown in the following table :—

Sl. No.	Category	68-69	69-70	70-71	71-72	72-73	73-74	74-75	75-76	76-77	77-78	78-79
1. Collisions . .	47	54	59	57	59	66	66	64	45	54	55	
2. Derailments . .	684	751	648	667	598	578	696	768	633	705	778	
3. Collisions with road vehicles at level crossings . . .	129	111	121	118	131	125	140	105	86	93	86	
4. Fires in trains . .	48	47	12	22	25	13	23	27	16	14	12	

Whereas the number of collisions has shown only a marginal variation and there is a decrease in the number of accidents at Level crossings and Fires in Trains during the year under review as compared with last year, it would be seen that there is a substantial increase in the number of derailments, the current figure being statistically the highest since 1968-69. The need for more vigorous watch on the standards of maintenance of rolling stock, track and related assets is indicated.

General Regulations

3.2 (a) Rules for the guidance of the Officers of the Commission of Railway Safety for holding inquiries into Railway accidents are contained in the "Statutory Investigation into Railway Accidents Rules, 1973" notified by the Ministry of Tourism and Civil Aviation.

According to the requirements of the "Railway (Notices of and Inquiries into Accidents)

Rules, 1973" notified by the Ministry of Railways (Railway Board), all accidents as described in Section 83 of the Indian Railways Act are reported. As per explanation below clause 3 of the Rules these accidents include :—

".....Accidents of a description usually attended with loss of human life are meant to include all accidents to passenger trains like collisions, derailments, train-wrecking or attempted train wrecking, cases of running over obstructions placed on the line, of passengers falling out of trains, or of fires in trains, in which no loss of life or grievous hurt as defined in the Indian Penal Code, (hereinafter referred to as the grievous hurt) or serious damage to Railway Property of the value exceeding Rs. 1,00,000 has actually occurred but which by nature of the accident might reasonably have been expected to occur; and also cases of land slides, or of breaches by rain or flood, which cause the interruption of any important through line of communication for at least 24 hours".

(b) The relevant portions of para 2 of Statutory Investigation into Railway Accidents Rules, 1973, are reproduced below:—

“2(b) ...Every accident to a train carrying passengers which is attended with loss of human life, or with grievous hurt as defined in the Indian Penal Code to a passenger or passengers in the train or with serious damage to railway property of the value exceeding one lakh rupees and any other accident which in the opinion of the Commissioner of Railway Safety or the Additional Commissioner of Railway Safety requires the holding of an inquiry shall be deemed to be an Accident of such a serious nature as to require the holding of an Inquiry.

2(3) Where the Commissioner of Railway Safety considers the holding of an Inquiry into an accident necessary, he may either hold the inquiry himself or direct the Additional Commissioner of Railway Safety to do so.

Explanation: The Inquiry under this rule shall be obligatory only in those cases where the passengers killed or grievously hurt were travelling in the train. If a person travelling on the footboard or roof of a passenger train is killed or grievously hurt or if a person is run over at a level crossing or elsewhere on the railway track, an inquiry under this rule shall not be obligatory. Similarly, if in a collision between a road vehicle and a passenger train at level crossing, no passenger in the train is killed or grievously hurt, it shall not be obligatory to hold an inquiry. For the purpose of this rule, workmen's trains or ballast trains carrying workmen shall also be treated as passenger trains and in the event of a workman getting killed or grievously hurt as a result of an accident to the train, an inquiry under this rule shall be obligatory.

2(5)(a). If, for any reason, the Additional Commissioner of Railway Safety is unable to hold an inquiry at an early date after the occurrence of such an accident, he shall inform the Head of the Railway Administration concerned and the Railway Board accordingly and he shall also inform the Commissioner of Railway Safety of the reason why an inquiry has not been held by himself.

2(5)(b). On the receipt of the proceedings of the Joint inquiry (inquiry made by a Committee of Railway Officers) from the Head of the Railway Administration in accordance with rule 15 of Railway (Notices of and Inquiries into Accidents) Rules, 1973, the Additional Commissioner of Railway Safety shall scrutinise the same and in case he agrees with the findings of the Joint inquiry, shall forward a copy of the report to the Commissioner of Railway Safety alongwith his views on the findings and recommendations made. If, on the other hand, the Additional Commissioner of Railway Safety

after examination of the Joint inquiry proceedings, considers that an inquiry should be held by himself, he shall, as soon as possible, notify the Commissioner of Railway Safety, the Railway Board and the Head of Administration concerned of his intention to hold an inquiry and he shall at the same time fix and communicate the date, time and place for the inquiry.”

Scope of Statutory Inquiries

3.3 The Additional Commissioner holds inquiries into accidents with a view to ascertaining the causes and fix the responsibility thereof on the individuals concerned. Investigations are also carried out into the question as to whether prompt and adequate steps were taken by the railway administration for relief measures, e.g. first aid, medical treatment, refreshments, evacuation of injured passengers and facilities given to passengers such as arrangements for transhipment, completion of their journey to destination, running of duplicate trains, etc. As a result of his inquiry, the Additional Commissioner also makes certain recommendations which are designed to prevent a recurrence of similar accidents, e. g. new rules or equipment for ensuring safety, improved standards of signalling, construction, operation and maintenance of track, bridges etc. He also comments on matters observed by him during the course of his inquiry which may not have any direct bearing on the cause of the accident under investigation but generally affect the safe working of the railway and may cause accidents.

Procedure for holding inquiries

3.4 (a) Under the Statutory Investigation into Railway Accidents Rules, 1973 the Additional Commissioner of Railway Safety on receiving intimation of the occurrence of a serious accident proceeds to the site by the quickest possible means and records all particulars, after careful inspection, before acceding sanction to the Railway for clearance of wreckage and restoration of the lines. He then carries out tests as required and records evidence. The emphasis has necessarily to be on the material and circumstantial evidence at site, which in almost all cases leads to the determination of the cause or causes.

(b) Officers of the local magistracy and police are advised of the inquiry and may attend the same. The press and the public are not admitted to an Additional Commissioner's inquiry. The public, is however invited through the press and the radio to give evidence at his inquiry in the capacity of witnesses.

Statutory inquiries in 1978-79

3.5.1 During the year, 28 accidents were inquired into by officers of the Commission of Railway Safety. These are listed in Appendix 'B'. Of these, 11 were cases of collisions

between trains, 2 were of collisions between trains and road vehicles at level crossings, 11 were derailments and 2 were cases of fire. One case involved passengers being struck by projecting steel rods bluging out of a wagon and another involved side collision with a motor truck.

3.5.2 During the year, the inquiry into four accidents was entrusted to Railway Administrations on account of heavy work load in the Commission and lack of officers consequent upon posts having to remain vacant. Of, these, 2 were collisions, and the others derailments. A list of these accidents is at Appendix B-1.

3.5.3 The Accidents inquired into by the Commission are summarised below along with the significant recommendations: —

(I) *Derailment of No. T. 159 Down Bombay V.T.—Thane suburban train between Matunga and Sion Stations on Central Railway on 7th. April, 1978.*

Casualties : Killed—Nil; Injured—6 (grievous-2)

Cause : Due to the outer brake hanger of the leading left wheel on the leading bogie of the 8th coach getting dislodged and forming an obstruction in the path of the train.

Cost of damage : Rs. 35,620.

Recommendations :

(1) The integrity of brake rigging on EMU stock needs improvement, if necessary, by strengthening/modifying various components therein. Similar recommendation had also been made in an earlier report on the derailment of a suburban train on the Western Railway in October 1976.

(2) For want of stabling capacity in the yard EMU rakes are being stabled on the platform lines at night. A thorough examination of the under-gear from the platform side is not possible in such cases. While the development of additional stabling lines for night inspection should be planned, it is essential that the integrity of the fixtures is improved to ensure that they remain intact from one weekly schedule to another.

(3) The components should be made out of more wear-resistant material so that they last from p.o.h. to p.o.h. or any alternative provision should be made for examination and replacement of the components at more frequent intervals.

(4) The integrity and technical soundness of manufacturing firms become cardinal factors in assuring the quality of supply as it may not be practicable to ensure a cent-per cent check.

It is desired that all components used on electrical rolling stock should be obtained only from approved manufacturers of proven ability borne on a panel.

(5) A work-study of the stabling and maintenance depots for EMUs should be carried out urgently and augmentation of man-power wherever necessary and provision of leave reserve adequately should be carried out without delay.

(6) There is a shortage of compressors resulting in quite a few EMU rakes operating with only two. Since air supply is a vital requirement for safe operation of the EMU's the shortage should be made good.

(7) The maintenance of EMU's in its entirety-both on the line and in shops-should be in accordance with the policy, of the Railway Board vide their letter no. E(NG)I-76-EMI/14 dated 17-7-76. Divided responsibility between Departments for maintenance of the EMU's is not conducive to efficiency. Restructuring of the organisation is suggested without delay.

(8) Staff dealing with sophisticated and high-voltage equipment on the electrical side and large number of safety items on the mechanical side should possess the skill and knowledge appropriate for these duties. There seems to be dilution in quality due to various reasons. The recruitment and training of staff for maintenance of EMU's at all levels should be on a sound footing. From this point of view, their initial qualification, training in industrial institutes, direct induction of trade apprentices and periodic medical examinations and refresher training to various categories of maintenance staff should be planned.

(II) *Rear-end Collision between No. 537 Dn. Churchgate-Virar Suburban train & No. 7 Dn. Delhi-Ahmadabad Janata Express between Naigaon and Vasai Road Stations on Western Railway on 18-4-1978.*

Casualties : Killed 31; Injured 68 (grievous-32)

Cause : Due to the Express train being driven past a blank Automatic Signal into the section beyond without requisite care and at such a speed as did not enable the Driver to stop short of the obstruction—failure of Railway staff.

Cost of damage : Rs. 28,200.

Recommendations :

(1) The five EMU rakes on Western Railway and similar rakes on Central Railway should be provided with standard side-buffers with suitable centre couplers on top-priority to minimise the consequences of impact.

(2) The design of EMU stock should be reviewed for improving their crash-worthiness.

(3) Separate switches should be provided for head and tail-lights in the cabs of suburban trains in replacement of the single switch controlling both.

(4) A more effective last vehicle indication should be considered, particularly in suburban sections where trains follow each other at very close intervals. Indications such as flasher light unit in cases of stoppage is commended for consideration.

(5) Use of only fire retarding/resisting paint of appropriate quality should be ensured to minimise the consequences of the out break of fire.

(6) The shifting of ladies compartments from the ends of suburban trains to the middle may be considered;

(7) Doors should be provided in intermediate partitions of 2nd class compartments in EMU rakes for an exit during emergency. Even doing away with such partitions may be examined.

(8) The manufacture of vestibuled EMU rakes should be expedited.

(9) Signal posts in suburban sections should be coated with luminous paint to improve their visibility in the night.

(10) System of surveillance on signal installations should be improved to obviate the incidence of blank signals.

(11) Integrity of signalling installations in suburban sections has to be further strengthened by providing red lamp protection, cascading etc.

(12) Infra-structure for maintenance of signals should be suitably buttressed with necessary additional inputs.

(13) The signalling equipment in the suburban sections is put to very intensive use. It is necessary that an appropriate schedule of renewal is framed to suit the needs.

(14) Existence of broken rail protection in automatic signalling territory should be verified.

(15) Location/relay boxes and signal lamp housings may be adequately secured and locked to prevent unauthorised access.

(16) A suitable public address system for verbal communication between passengers and running crew and between the crew, so that passengers could be alerted in an emergency should be evolved for the suburban service without further delay.

(17) The scope of the work of providing automatic warning system to EMU trains

should be enlarged to cover all locomotives running on the suburban section. Without doing so, the purpose of A.W.S. will not be fully served.

(18) The unauthorised practice in vogue of switching OFF & ON the rear head/tail light by suburban guards should be prohibited.

(19) The circumstances under which traction power supply was not promptly cut off after the accident should be probed into and corrective measures taken.

(20) In case of major accidents, Railway Administration should detail a senior officer to liaise with police etc. and help in making over the dead bodies to the next of kin and also to attend to incidental details.

(III) Collision between 3 Up Assam Mail and Diplorry in Salamari station yard on North-East Frontier Rly. on 23-4-78.

Casualties : Killed—Nil; Injured: 20 (grievous-3)

Cause : 3 Up Assam Mail running into a heavily-loaded Dip Lorry on track on account of inadequate protection afforded to the latter-failure of Railway staff.

Cost of damage : Rs. 4,68,000.

Recommendations :

(1) The Divisions must have some ready made arrangements to take photographs of the wreckages in the case of serious accidents, as their value for the purpose of evidence would be very great.

(2)(a) North-Eastern Railway should ensure that brake-power certificates are issued in the standard form with all the information.

(b) The incoming Drivers should hand over the brake-power/certificates in their possession to their successors in cases where fresh brake-power certificates are not issued when Drivers change.

(3) Lorries must be protected by two men following and/or two men preceding so that one flagman carries a banner flag at not less than 600/400 metres from the lorry and another flagman carries hand signal flag and detonators at not less than 1200/800 metres.

(4)(a) Only literate staff should be authorised to work lorries/trollies.

(b) Only District/Divisional Officers should be authorised to issue competency certificates to work lorries/trollies after personal examination, so that requisite detachment may be injected into the system.

(5) Automatic electrical reversers should be provided for the automatic replacement of starters on the passage of trains on all Trunk Routes and main lines.

(6) Board's instructions regarding marshalling of passenger trains should be strictly complied with.

(7) Any error on the part of the doctors in the classification of injuries should be on the safe side. Necessary steps may be taken to avoid errors in classification of injuries on the lower side.

(8) The practice of notching the guard rails and spiking them to sleepers on girder bridges, may be adopted on all Railways so that bunching of sleepers may not take place as a result of accidents.

(9) A spirit of co-operation should exist among departments. Officers/Senior Supervisory staff should ensure that trolleys/lorries are adequately protected by constantly counselling the staff under them.

(IV) *Fire* in 286 Down Shahganj-Mau Passenger between Khurahat and Mau Stations on North Eastern Railway on 11-5-1978.

Casualties : Killed—9; Injured-24 (grievous-3)

Cause : Cause as arrived at by the Inquiring Officer is under Government's consideration.

Cost of damage : Rs. 1,00,000 approximately.

Reccomendations :

(1) Surprise inspection by Supervisory officials of checks conducted by the Train lighting staff is necessary.

(2) The desirability of not resorting to blanking of the alarm chains in passenger carrying trains for indefinite periods may be considered.

(3) N.E. Railway Administration may comply with Railway Board's orders not to blank off alarm chain in partial RMS-cum-passenger coaches.

(4) N.E. Railway Administration may comply with Railway Board's order to issue caution orders to the Guard and the Driver when the Alarm Chain is blanked off in any train or in any coach of a train.

(5) It is desirable that wiring diagrams and history cards are maintained by the Railways in respect of individual coaches.

(6) The Driver of a locomotive working a train should be in possession of a brake power certificate during the entire run.

(7) N.E. Railway administration may ensure adherence to the maintenance schedules prescribed in the IRCA conference Rules Part IV and the code of practice for maintenance of Electrical equipment on coaches by all the Train Lighting Depots on the Railway.

(V) *Rear-end-Collision* of Light engine No. 21821 WCAM1 with stationary 42 Up Viramgam Passenger at Vaisad station on Western Railway on 22-5-1978.

Casualties : Killed—Nil; Injured—3 (all grievous)

Cause : Light engine having been driven without due care and vigilance at an excessive speed and shunting of engine not supervised by shunting staff—failure of Railway staff.

Cost of damage : Rs. 41,100.

Recommendations :

The Station Working Rules for the Station should be amplified to indicate the detailed procedures to be followed for the movement of light engines being attached to or detached from any trains so that the provisions of SR (147) (2) are highlighted. Similar action should be taken at other stations also where movement of locomotives are not being guided by special shunting staff.

(VI) *Derailment* of No. 26 Up Air conditioned express at Dahanu Road station on Western Rly. on 24-5-1978.

Casualties : Killed-1; Injured-3 (grievous-1).

Cause : Could not be definitely established.

Cost of damage : Rs. 6,24,853.

Recommendations :

(1) RDSO may study the effect of deficiency of guide rollers in MAN/BEML coaches to take suitable follow-up action.

(2) RDSO should explore the possibility of using alternative metal for guide rollers or improve the means of securing them to make their removal by antisocial elements difficult.

(3) The pit facilities at Bombay Central are grossly inadequate for the needs. Due to the lack of pit facilities, most of the trains are examined partially or by shunting or in the washing lines were there is no pit at all. The arrangement is far from satisfactory and needs to be augmented on top priority to ensure underframe inspections of safety items at prescribed intervals.

(VII) *Derailment* of 328 Down (Danapur-Howrah) Fast Passenger Train between Althmalgola and Barh Stations on Eastern Railway on 28-5-78.

Casualties : Killed—10; Injured-26 (grievous-13).

Cause : On account of spread of gauge of the track due to, in all probability, the buckling of the left rail owing to missing/

slack track fittings. This is, however, under Government's considerations.

Cost of damage: Rs. 2,45,200.

Recommendations:

(1) (a) A complete census of missing fittings on Long Welded Rails should be taken at once and missing fittings made good on all Railways, apart from ensuring that the fittings are tightly secured by using oversize keys and/or washers/liners as necessary.

(b) Key fastenings with steel sleepers should be banned altogether on Long Welded Rails (LWR) in future irrespective of the traffic density, since doubled key fixture at each rail seat seriously affects the soundness of a track assembly in case keys are stolen or become loose.

(c) Para 4.1.3 of the LWR Manual should be amended prohibiting LWR on wooden and CST-9 sleepers with steel keys even on M. G. in locations where such fastenings are likely to be stolen or become loose due to vibrations set in motion by trains passing over rails which have developed or are likely to develop corrugations.

(d) The A.C. bearing plates permitted on LWRs with wooden sleepers on M. G. should be one key type and not two key type.

(2) Action should be expedited on the recommendations of Shri Kripal Singh, Ex-Chairman, Railway Board, constituting the one-man expert Committee on Railway Security and Protection.

(3) (a) All railways may be advised to eliminate timber bed blocks on girder bridges expeditiously.

(b) Railways may be advised to convert small span girder bridges into ballasted decks whenever LWR is laid, unless the cost is prohibitive or such conversion is not physically possible. Para 5.6.2. of the Manual of Instruction on LWR (Provisional) 10/70, should also be suitably amended.

(4) Only wooden sleepers, properly anchored and well-ballasted, should be used at the approaches to girder bridges to cover the portion of the guard rails so that the latter might be fixed properly and add to the lateral strength of track at a weak point like an approach to a girder bridge without hindering the packing operations. It also appears to be *prima facie* feasible to fix guard rails to ST sleepers at approaches by drilling suitable holes in ST sleepers.

(5) (a) Eastern Railway may undertake a review of the jurisdiction of PWIs and bring them into manageable sizes as recommended by efficiency Bureau.

(b) Eastern Railway may maintain enough reserve strength of trained PWIs to be deployed on special works.

(6) Necessary steps may be initiated for the prevention of loss of track components.

(7) Hot weather patrols should be effective. In practice, they were left to themselves with no check on their movements. In some cases, only one man was deployed where two are required in the beat. There is a strong case to review and revise the instructions in order to make patrolling more effective and fool-proof.

(8) Brake power certificate is an important document and should be prepared issued and accepted with a sense of responsibility.

(9) Wooden bodied SLR was attached as the last vehicle. There seems to be need to repeat Board's instructions on the marshalling of passenger trains. It is vital that these instructions are observed strictly.

(10) The train crew were not clearly aware of the maximum permissible speeds and booked speeds on the sections. Discrepancies in the Working Time Table also added to the confusion. They should be put right.

(11) Eastern Railway should take effective steps to improve the standard of maintenance of coaches and quality of p.o.h. in the shops.

(12) The guard was not provided with a stretcher and emergency lighting equipment. The Railway should take steps to correct it.

(13) Some staff were either not-qualified in First Aid or did not undergo refresher courses in First Aid for a long time. Similar lapses were also noted in an earlier accident. The position should be reviewed and suitable steps taken without delay to bring the training up-to-date.

(VIII) *Collision* between 74 Down Parcel Express and a road vehicle at Level Crossing 342-B between Bilpur and Miranpur Katra stations on Northern Railway on 26-2-1978.

Casualties: Killed-22; Injured-43 (grievous-27)

Cause: Due to the level crossing gates being kept open to road traffic in the face of the approaching train-Failure of Railway staff.

Cost of damage: Rs. 350.

Recommendations:

(1) The present arrangements of drawing personnel for manning Level Crossing need a review and literate men on suitable grades of pay should be posted.

(2) Prompt follow-up action in the matter of reclassifying level crossings based on quinquennial census is desired.

(3) The system of exchange of private numbers at Miranpur Katra needs to be tightened up.

(4) The Station Working Rules of Miranpur-Katra need a correction in respect of (i) Working of the level crossing and (ii) enabling the switchmen at the Cabin to correctly comply with GR 36 and 37 while despatching Up trains.

(5) Delays in turning out of Relief Vans to attend to accidents should be avoided.

(6) The Commercial work load at the station needs a review with a view to afford relief to the train passing staff.

(7) The normal position of the gates at the level crossing should be changed from "closed to road" to "Open to road" with corresponding reclassification of duties of the Gatemen and Protection with gate signals.

(IX) Derailment of 47 Up "Trivandrum Central Cannanore Express" between Kurupantara and Piravam Road stations on Southern Railway on 1-8-1978.

Casualties : Killed-Nil; Injured-23 (grievous-8)

Cause : Deliberate tampering of the track by persons unknown.

Cost of damage : Rs. 80,000.

Recommendations :

(1) The maintenance of the Broad Gauge track between Trivandrum and Ernakulam after its conversion nearly three years ago still remains with the Construction Organisation. This is unsatisfactory. Open line should take over the maintenance early.

(2) The derailed train had neither portable telephone nor emergency light. The Railway Administration should tighten up administrative measures to ensure that all trains are fully equipped with safety aids.

(3) Once again the engine involved in the accident did not have a working speed recorder. This has been noted and brought out time and again in various accident reports. Yet there seems to be no perceptible improvement in the reliability of speedometers. It is necessary for the Board to take some radical measures to rectify this situation.

(4) Relief arrangements from the Railway's side were not entirely satisfactory. Better training of staff on how to cope with emergencies is called for.

(5) There is need to design and use reverse Jaw anticreep bearing plates as an anti-sabotage measure. Other measures like non-removable keys, etc. should also be used on this section.

(6) The approaches to bridges have been provided with free rails though this is not necessary and welded rail can be provided as per extant orders. The rails on approaches as well as those on bridges (where permissible) under extant orders may be welded early.

(X) Collision between T-83 Down Bombay VT-Thane suburban train and C-39 Down Bombay VT-Kurla Suburban train between Masjid and Sandhurst Road stations on Central Railway on 7-8-1978.

Casualties : Killed—Nil; Injured—18 (grievous-3)

Cause : Due to No. T-83 Down Suburban train being pushed back into the section in rear which was occupied by No. C-39 Down Bombay VT-Kurla Suburban train—Failure of Railway staff.

Cost of damage : Rs. 7,51,500.

Recommendations :

(1) The means of reversal should be taken away from the driving cabs of EMU trains as done on the Western Railway.

(2) The advisability of verifying the effectiveness of emergency braking from the Guard's cab of EMU trains before they are released for service after fortnightly attention in the car shed should be examined.

(3) Necessary modifications should be carried out in the braking system of EMU rakes proposed to be fitted with composition brake blocks with the utmost expedition and, in the interim to revert to conventional cast iron brake blocks.

(4) Guards of Suburban trains whenever required to leave their cabs in unusual circumstances should do so only after operating the emergency brakes, so that the trains are not moved in their absence.

(5) Provisions of General Rule 182 should be forcefully brought home to all the concerned staff.

(6) The system of breath analyser test should be introduced as early as possible.

(7) Driving crew should be specifically questioned on their smoking habits during periodical medical examinations and warned of the ill effects of heavy smoking.

(8) The scheme of psychological check-up of Drivers of Mail and Express trains aged 45 years and above should be put through on

full scale (including Motormen) without delay, a beginning being made straightway with Motormen and Drivers operating on the Bombay Suburban sections.

(9) (a) The complement of Safety Counsellors and Loco Inspectors in Bombay Division and elsewhere may be augmented as necessary.

(b) The advisability of having a short course of crash training for Driving crew in between the regular refresher courses may be examined.

(XI) *Collision* between No. 15 "Madras-New Delhi Grand Trunk Express" and a run-away BCXT wagon between Tondalagopavaram and Errupalem stations on South Central Railway on 26-8-1978.

Casualties : Killed-2; Injured-9 (grievous-4)

Cause : Due to non-observance of rules while performing shunting at Tondalagopavaram coupled with granting of permission to approach for No. 15 GT Express by an employee who was off-duty in the absence of the on-duty ASM-Failure of Railway staff.

Cost of damage : Rs. 26,29,000.

Recommendations :

(1) There is need for Railway Administrations to keep in view safety consideration while planning steps for increasing operational efficiency since the latter often conflicts with the former. The Board should emphasise this aspect to all the Railways.

(2) There is need for more purposeful safety meetings of staff and greater attention to suggestions put forward by the staff at these meetings.

(3) The liberalisation of rules for safety in marshalling contained in Railway Board's letter No. 77-CHG/II/14/3 of 9/13-2-1978 is a retrograde step and earlier orders regarding marshalling of SLRs should be restored.

(4) The tendency to have yards in grades sharper than 1 in 400 and even 1 in 260 should be curbed. Slip sidings should be made compulsory for yards laid with grades sharper than 1 in 400. No yards in grades greater than 1 in 260 should be permitted. RDSO should be asked to examine what modifications are required to para 2 and Note (iii) (b) of Chapter II of the Schedule of Dimensions in view of the increasing number of wagons with roller bearing in use.

(XII) *Derailment* of train No. 285 Up Passenger between Pharia and Sarai Mir stations on North Eastern Railway on 2-9-78.

Casualties : Killed-5; Injured-5 (grievous-4)

3—602 CRS/Luck/80

Cause : Fury of Nature-storm.

Cost of damage : Rs. 15,300.

Recommendations :

(1) Effective steps should be taken to ensure that the accident Relief Medical Vans are turned out promptly and in accordance with schedules laid down by the Railway Board.

(2) Medical Relief van and Auxiliary van should be placed in such a way that both the units are together berthed in a convenient line in the traffic yard with two exits, so that the vans could be turned out when required with minimum loss of time.

(XIII) *Passengers* being struck by steel rods bulging out of a wagon moving on the adjacent line involving train No. 40 Up Ahmedabad-Bombay passenger at Valsad station on Western Railway on 18-9-1978.

Casualties : Killed-1; Injured-3 (all grievous)

Cause : Steel rods of an inadequately secured consignment in a BFR getting dislodged during shunting operations leading to some rods in the top layers protruding out and forming an obstruction in the path of the Passenger train approaching on the adjacent line-Failure of Railway staff.

Cost of damage : Negligible.

Recommendations :

(1) Instructions contained in Railway Board's letter No. TC-R/1057/18/69, dated 21-8-1969 may be reiterated and supervisory checks intensified.

(2) RDSO should develop suitable guide lines regarding securing to cover consignments like ribbed steel rods which are normally transported in bent form and have a tendency to open out.

(3) Packing conditions in the Goods Tariff have to be amplified and those which have a bearing on public safety may be made compulsory.

(4) The compulsory external packing conditions should form a part of Train Examiner's Manuals and also be included in the curriculum of Training Establishments where Train Examiners undergo initial and refresher courses.

(5) 'Sick' or 'damaged' labelled wagons or other stock be shunted on lines which are alongside the passenger running lines only when block conditions are ensured on those lines.

(6) There is need for Railway Board to go into all the cognate aspects of over loading of wagons beyond the design capacity and review their extant orders.

(XIV) Collision between 30 Up Howrah-Bombay Express and part load of No. Y 10 Up Goods train in Asangaon station yard on Central Railway on 20-9-1978.

Casualties : Killed—2; Injured—47 (grievous—8)

Cause : Shunting being carried out on the part load of No. Y 10 Up Goods train beyond the Up outermost facing points without blocking back the line, coupled with the inability of the Express train driver to control and halt in rear of the Up Home Signal which was at Danger—Failure of Railway staff.

Cost of damage : Rs. 13,61,500.

Recommendations :

(1) The implementation of various programmes like Automatic warning system to improve safety is still a long way off. In the circumstances, it is desired that efforts may be redoubled towards improving the human factor which continues to be the prime cause in accidents, through all available means, such as, more effective surveillance by supervisors, meaningful man to man contacts by safety counsellors and loco inspectors, etc.

(2) Extant standards set for in-service promotion to the category of Assistant Station Masters should be reviewed and upgraded as warranted.

(3) The high incidence of slack and worn out brake blocks should be probed into and necessary correctives adopted.

(4) Electric Loco Sheds should verify the condition of tail lamps on locos before they are booked out.

(5) The advisability of prohibiting detachment of wagons from Up goods trains at Asangaon should be examined.

(6) Effective measures should be taken for the proper maintenance of speed-recorders.

(7) (a) The importance may be highlighted of Drivers and Guards taking due note of the endorsement in the Vacuum Brake Certificates before signing the same.

(b) Suitable remedial action should be taken to ensure that Vacuum Brake Certificates are prepared with requisite care.

(8) (a) The directive contained in Railway Board's letter No. 67/Safety-I/26/2, dated 14th May 1971 regarding regulating the speeds of trains if no signal indication is available from the Warning Board, etc. should be effectively brought home to driving crew.

(b) Lists of locations covering each crew or engine run at which the Distant/Warner/

the first Stop Signal as the case may be, is not visible from the Sighting Board should be made out and furnished to Drivers as personal copies for their guidance.

(9) The day and night visibility of Up reception signals of Asangaon whose approach is situated on an 'S' curve and other similar stations should be rechecked and steps taken to improve signal sighting as warranted.

(XV) Collision between No. 316 Up "Miraj-Pune" passenger train and M/32 LNN Down Diesel Goods between Bhavaninagar and Takari stations on South Central Railway on 11-10-1978.

Casualties : Killed—10; Injured—35 (grievous—10)

Cause : Due to the driver of the Goods train having passed the Down Main line starter and Advanced starter at Danger and going into the Block Section 'Bhavaninagar-Takari' without proper authority—Failure of Railway staff.

Cost of damage : Rs. 8,94,281.

Recommendations :

(1) (a) When a full train load or a substantial number of wagons (say above 10) have to be attached at a way-side station without train examination facilities, special arrangements must be made for examination by a trained TXR or Carriage and wagon Fitter who should issue the necessary brake power certificate as per rules.

(b) The need for training Operating staff like Driver, Guard, Station Master and Goods Clerk in the examination of wagons is reiterated.

(2) (a) 85% brake power should be treated as the minimum when a Goods train is started from a train examining station and if more cylinders are found inoperative enroute, the maximum speed of the train should be reduced till the percentage of effective cylinders is again brought back to 85%.

(b) Instructions may be issued for checking the travel of the piston of the vacuum cylinder during brake power examination and treating all pistons whose travel falls outside the minimum and maximum prescribed as inoperative.

(3) An effective means of enabling the Driver to differentiate when sighting the Distant itself as to whether he is to run through or stop on the Main line be evolved, without obliterating the present distinction in the aspects of the Distant when the train is being received on the Main line or on the loop. A suggested method is the provision of two fish tail arms to be taken off to 90°

for run-through trains by day and double green at night.

(XVI) *Derailment of 1 Up Howrah-Delhi-Kalka Mail between Baruipara and Kamarkundu stations on Eastern Railway on 4-11-1978.*

Casualties : Nil

Cause : On account of unauthorised interference with the track by some person(s) yet unknown.

Cost of damage : Rs. 5,38,250.

Recommendations :

(1) Urgent consideration may be given by the Track Standards Committee to the selection of single key/two key type anti-creep bearing plates, use of non-removable keys with two key type anti-creep bearing plates and provision of reversed jaw bearing plates etc. Review of the existing anti-sabotage, anti-theft measures is also necessary to examine and improve the position.

(2) Railway Board may issue instructions regarding the restrictions to be placed on the use of WAM-4 locomotives with lateral links/broken lateral links.

(3) It is desirable to deploy Police/RPF dogs in sabotage cases. This may be got examined at an Expert level.

(4) All redundant rail joints, technically amenable to welding, should be welded when welding work is undertaken on a length.

(5) When a speed restriction is imposed covering a complete block section/sections, the same should be treated as the maximum permissible speed and the booked speed should be limited to 10% less than that speed, so that reasonable make-up time is available for Drivers to cover unforeseen losses on the run without exceeding the maximum permissible speeds. Necessary instructions may be issued by the Railway Board on this issue.

(XVII) *Collision between No. 47 Up Suburban train and 562 Up 'Manmad-Kacheguda Passenger' train between Malkajgiri and Secunderabad stations on South Central Railway on 6-11-1978.*

Casualties : Killed—Nil; Injured—5 (grievous—1).

Cause : Due to the failure of Railway staff to observe due caution after passing signal 43 at Danger.

Cost of damage : Rs. 78,250.

Recommendations :

(1) Signal No. 43 which is a combined level crossing and block section signal should be converted to pure gate signal and

another signal should be erected immediately ahead of the level crossing to operate as section signal.

(2) The booked speeds of the suburban trains are not being shown in the Working Time Table. It is recommended that this be done immediately.

(3) If the Railway cannot give up working trains tender foremost, they should reduce to the speed limit of 25 kmph and replace the wooden coaches by steel anti-telescopic ones at least as 1st two from either end. The Board should take note of the need to replace steam engines by diesel engines for suburban service on priority.

(4) Discrepancy in timings given by Railway staff was due to non-synchronisation of watches by operating staff as required by rules. Action to educate the staff in the matter may be taken.

(XVIII) *Rear-end Collision between Down Durgapur special and Down Asansol Special Goods Trains between Rajkharsawan and Mahali Marup stations on South Eastern Railway on 1-12-1978.*

Casualties : Killed—1; Injured—2 (grievous—Nil).

Cause : Due to failure of Railway staff, not having exercised great caution after passing Automatic signal AS-32 at 'ON'.

Cost of damage : Rs. 1,12,250.

Recommendations :

(1) S.E. Railway should ensure that:

- (a) Side-lights are restored on the brake-vans of all trains in terms of General Rule 144; and
- (b) Checks are exercised at various levels to see that tail lights of trains are properly cleaned, maintained and fixed to the last vehicle.

(2) Reasons for shortfall in Ambush checks/Night inspections by the Officers/Officials of Chakradharpur Division should be investigated and necessary steps taken to redeem the situation.

(3) ARME Vans should be relocated in electrified sections so that other than electric power may haul them in case of power failures or alternative means to haul them should be investigated.

(4) Effective rear end warning system by suitably redesigning the tail light should be finalised.

(5) Quality of C&W examination on Chakradharpur and neighbouring divisions should be improved.

(6) Suitable Gauges should be devised to check piston strokes.

(7) A new GR 277 (3), as follows, may be added to guide the Drivers in Automatic Signalling sections.

"Rule 277 (3) : In all circumstances, the Driver shall so adjust his speed that he can bring the train to a stop within the distance upto which the line ahead can be clearly seen."

(XIX) *Derailment of 17 Up Sawai Madhopur-Loharu Express between Jhunjhunu and Ratanshahar stations on Western Railway on 3-12-1978.*

Casualties : Nil

Cause : Unauthorised interference with track.

Cost of damage : Rs. 42,200.

Recommendations :

(1) (a) Pending evolvement of track fittings of 'fit and forget' type not susceptible to tampering, advisability of deployment on steel through sleepers of 2-way keys of non-removable type to the extent of 50% alternately on either side should be considered.

(b) The use of modified loose jaws as per drawing at Annexure III of the concerned accident report with non-removable keys to improve the integrity of steel trough sleepers should be examined for standardisation.

(2)(a) Instructions should be issued that in cases of suspected tampering with the track, the dislodged components should be paint-marketed after assigning proper notations before they are removed for custody or photographed. These should also be mentioned in the point inventory of fittings and field notes/sketches (to be got signed by the Police as well).

(b) A directive should be issued that tools which are likely to leave their imprint should not be used to remove and assemble the affected rails and sleepers particularly, those close to the location where track is suspected to have been interfered with.

(3) It is to be ensured that derailed stock where derailed and worked away from site is invariably stabled as such on a convenient siding nearby for inspection and not put back into service without the approval of the Inquiring Authority.

(XX) *Derailment of 136 Up "Madurai-Madras Egmore Vaigai Express" at Tiruchirappalli station on Southern Railway on 22-12-1978.*

Casualties : Killed—Nil; Injured—1 (grievous).

Cause : Reversal of points No. 131 while the train was passing—Failure of Railway Staff.

Cost of damage : Rs. 15,480.

Recommendations :

(1) One of the factors responsible for such accidents is the fear among the staff that they would be taken up for detention to important trains which make them act in contravention of safety rules. The Railway Administration should take steps to re-assure the Signal staff on this point.

(2) The following procedures should be incorporated in the General Rules.

(a) Each failure should be reported *in writing* to all concerned by the Station Master on duty, even though the Signal Maintainer may be available in the cabin and the above message should be the latter's authority to attend to the failure.

(b) After defects have been put right and certified by the Maintainer, the S.M. should satisfy himself, if necessary, by a demonstration by the Maintainer and issue a rectification message jointly with the Maintainer.

(3) Similar to existing instructions on the permanent way side, more precise instructions detailing what works require to be done giving a disconnection memo, under traffic block, which work requires to be supervised at what level etc. should be incorporated in the Signal Engineering Manual in respect of Signal Department.

(XXI) *Collision between No. 57 Sapthagiri (Madras-Tirupathi East) Express train and Shunting Engine No. 22145 XB coupled with 2 empty coaches at Tirupathi East station yard, S.C. Railway on 30-12-1978.*

Casualties : Killed—Nil; Injured—11 (grievous—2).

Cause : Due to wrong admittance of 57 Exp. on occupied line—Failure of Railway staff.

Cost of damage : Rs. 80,050.

Recommendations :

(1) A master plan should be prepared for B.G. and M.G. terminal facilities required over a foreseeable future for Tirupati East station and operational facilities, as immediately required, should be provided.

(2) (a) Tirupati East station should not be treated a Terminal station. Or in the alternative, groups of M.G. and B.G. running lines should be segregated.

(b) A terminal station yard should be defined by the Railway Board so that different interpretations may not be given by different railways to get over local difficulties endangering safety all the same.

(3) Line No. 6 should be isolated from the passenger Running lines at Tirupati East by providing trap switches at either end.

(4) Rule III (3) under Chapter VIII of the Rules for the Opening of Railway, etc., for the public carriage of passengers should be liberally interpreted to mean that passenger running lines should be isolated from all other lines connected thereto.

(5) The Working Time Tables should be suitably amend to provide for a realistic running time for B.G. passenger trains between Renigunta and Tirupathi East stations.

(6) The Signal & Telecommunications Engineering Standards Committee may consider whether point indicators must be provided at all points on passenger running lines which are not directly interlocked with signals.

(7) The existing Cyclic Rosters at Tirupathi East station should be prepared with more emphasis on safety, while convenience of staff should, no doubt, receive due consideration.

(8) The 'E' type locks supplied by M/s. Industrial Corporation, Harmohan Ghosh Lane, Calcutta, should be got checked for the faulty drilling of holes in the lugs of the fixing bracket and similar other faults, since such faulty locks can lead to very serious accidents as the present case has demonstrated.

(XXII) *Side Collision* between 4 KL Up Fast Passenger Train and a Motor Truck on Central Railway between Mahisgaon and Shendri stations on 24-1-1979.

Casualties : Killed—Nil; Injured—1 (grievous)

Cause : Fouling of railway track by a road vehicle.

Cost of damage : Rs. 1,200.

Recommendations :

(1) The Road Authorities should widen the road between Kurdwadi and Latur to meet the present-day requirements, as early as possible.

(2) The Railway should shift the guard stones/sleepers stakes to a minimum of 1.83 Metres to obtain a reasonable margin between moving trains and road vehicles.

(3) The speed of the road vehicles should be reduced to 25 kmph through railway stations at Mahisgaon and Upalgaon and on narrow road bridges and culverts close to the track. Bumps should be provided at approaches to these two railway stations and long bridges/culverts on the road to ensure observance of speed restrictions.

(4) The defects regarding the condition of the road, truck driver's inexperience through licenced and the poor condition of the truck should be brought to the notice of the State Government for remedial action.

(5) The Railway Board should issue policy instruction regarding withdrawal of replaced N.G. Coaches. Replacement of overaged coaches should be stepped-up.

(6) Fitment of speedometers on N.G. Locos should be expedited.

(7) The provision of two brake vans on N.G. sections in accordance with Railway Board's instructions should be implemented by Central Railway.

(8) Special effort must be made by various means of communication to warn the passengers not to squat on the door sills facing the road way.

(9) The timings in the working Time Table need to be checked and re-cast to accord with the booked speed of the train to avoid over-speeding by drivers to maintain punctuality.

(XXIII) *Collision* between 10 Dn Arunachal Fast Passenger and a Road Vehicle at Manned Level Crossing No. RM/1 in Rangiya station yard on North-east Frontier Railway on 28-1-1979.

Casualties : Killed—2; Injured—9 (grievous—2).

Cause : Passenger bus having been driven into the level crossing which was closed against road traffic when the train was already over the level crossing—Negligence of bus driver.

Cost of damage : Rs. 2,860.

Recommendations :

(1) Provision of chain and lock arrangement at important level crossings is not a satisfactory arrangement. The visibility of the chain is poor. Important level crossings should be provided with lifting barriers or gate-leaves with lighting arrangement for the night.

(2) No traffic census was taken at this crossing for the last 10 years. Periodic traffic census should be carried out in accordance with Railway Board's orders to consider manning/upgrading of the crossing where justified.

(3) Visibility in the vicinity of the level-crossing should be improved.

(4) The level crossing gate did neither have any interlocking arrangement nor system of exchange of private numbers. Being on an important road, the gate should be interlocked with signals and exchange of private numbers should be adopted.

(5) Overhauling of the gate equipment is overdue. The Gatekeeper is also due for Medical Examination. This should be done.

(6) First-aid should be rendered to all those who are injured, whether they are train or bus passengers. This should be clarified to all the staff as they seem to be under an impression that 'First-Aid' is to be given only to train passengers.

(XXIV) *Derailment* of 380 Up "Quilon-Kottayam passenger" at Km. 151/1-2 between Quilon and Perinad stations on Southern Railway on 2-2-1979.

Casualties : Killed—2; Injured—14 (grievous—8).

Cause : Defect in the locomotive tender which hauled the train coupled with the defects in the track.

Cost of damage : Rs. 3,27,000.

Recommendations :

(1) Rly. Board may consider conducting trials in respect of side bearer clearances on the bogies of locomotive tenders and fixing their upper limits vis-a-vis acceptable service tolerances of alignment and cross levels on track.

(2) The procedure of exchange of private numbers between the Gatekeeper and the Station Master when trains are scheduled to enter the Block section may immediately be introduced at this level crossing and similar other level crossings.

(3) Evaluation of the quality of the curved alignment by the use of cumulative frequency diagrams may be introduced.

(4) Cannibalising of locomotive tenders during POH or in service is a highly undesirable practice and should be discouraged.

(XXV) *Fire* in coach No. SPPM 1516 of 37 Up Howrah Madras Janata express between Alamanda and Kantakapalli stations on South Eastern Railway On 2-3-1979.

Casualties : Killed—Nil; Injured—8 (grievous—3).

Cause : Live cinders from WP locomotive hauling the train igniting the dry wooden frame of the coach—This is, however, under Government's consideration.

Recommendations :

(1) Railway Board may review action taken by Railways to arrest the escape of large size sparks through the annular space available between the existing self cleaning spark arrestor table plate and conventional blast pipe cap of WP/WG, YP/YG and other classes of locomotives.

(2) There is need to review the procedure for testing the Alarm Chain Apparatus in coaches during POH to ensure physical examination of each link of the entire chain.

(3) The end wooden panels of wooden bodied coaches should be opened out from the inside partition and any accumulation of coal dust found in its services removed during POH.

(4) The end wooden panelling of wooden bodied coaches should be replaced with M.S. sheeting.

(5) Pending implementation of Recommendation No. 4 above, a mild steel cowl should be provided over the junction box if mounted on the outside of the end wooden panelling of all wooden bodied coaches.

(XXVI) *Collision* between 49 Up Howrah-Amritsar Express and Foodgrain Special in Jandiala station yard, Northern Railway on 9-3-79.

Casualties : Killed—3; Injured—28 (grievous—7).

Cause : No. 49 Express passing signal at danger.

Cost of damage : Rs. 33,98,000.

Recommendations :

(1) Instruction regarding safety marshalling should be strictly followed.

(2) Speed recording charts should be replaced when recording on one card has been completed.

(XXVII) *Derailment* of No. 171 Dn. Jammu Tawi Express at Makarpura station on Western Railway on 12-3-1979.

Casualties : Killed—Nil; Injured—19 (grievous—3).

Cause : The inquiry Report was still under compilation during the year under review.

Cost of damage : Rs. 9,66,500.

(XXVIII) *Derailment* of 104 Dn. Delhi-Howrah AC Express in Saktigarh Yard, Eastern Railway on 24-3-1979.

Casualties : Nil.

Cause : Unauthorised tampering with track by unknown persons.

Cost of damage : Rs. 4,00,000.

Recommendations :

(1) The VDO Speed recorder was not calibrated even for such an important train and the chart was not renewed.

(2) In all cases of serious accidents statements of staff and public who witnessed the occurrence should be recorded promptly after the accident on the same day.

(3) The entire question on patrolling by RPF armed guards should be reviewed to make the system more effective with in

built checks, documentation and more adequate safeguards and supervision. The Board may also examine the reasonableness or otherwise of the patrol duty hours of RPF Rakshaks.

(4) Board may review the quality of service rendered by RPF Rakshaks. Having done so the Board may issue broad guidelines to the Railways in regard to follow-up action.

(5) Board may review the anti-sabotage measures in the context of the present accident and issue comprehensive instructions in the form of Anti-sabotage Code.

Incidence of serious accidents inquired into during the period 1968-69 to 1978-79

3.6.1 The comparative position of serious accidents inquired into by the Commission during the year 1978-79 and those of the preceding 10 years is indicated in Appendices 'C' and 'D'.

3.6.2 It will be observed that the total number of serious accidents during the year has continued to be high. This is a cause for concern and the Railway Administrations will need to give serious attention to it.

3.6.3 As indicated in paras 3.5.3(I) to (XXVIII), a number of recommendations for improving the safety of Railway working were made by the Commission in the Inquiry reports of accidents during 1978-79. By and large, these recommendations have been accepted and

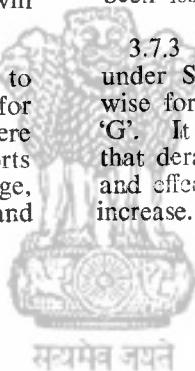
action initiated by the Railway Board and the Railways to implement them. It will be, however, necessary for the Railway Board to ensure that their implementation is expeditious and complete.

Accidents inquired into by railway administrations

3.7.1 Apart from the statutory inquiries made by the commission, the Railway Administrations conducted during the year 1978-79, enquiries into other accidents falling under section 83. These are summarised under different categories in appendix 'E'. A brief summary of some selected cases is given in appendix 'F'.

3.7.2. A study of the data shows that derailments and collisions at level crossings continued to be high. It will be also noted from appendix 'F' that there have been a number of accidents due to wheel and axle failures which indicates a disturbing trend and should be arrested through improved shop and maintenance practices. This has been taken due note of by the Railway Board who have advised that necessary instructions on the subject have been issued to the Railways.

3.7.3 A comparative position of accidents under Section 83 railway-wise and category-wise for the last 4 years is shown in appendix 'G'. It will be seen, as pointed out earlier, that derailments have been quite on the increase and effective steps need to be taken to stem this increase.



CHAPTER IV

MAINTENANCE OF RAILWAY ASSETS AND OPERATION

Preliminary

Pursuant to the acceptance of a recommendation made by the Railway Accidents Committee 1962, the Commissioner of Railway Safety is required to include in his Annual Report a general appreciation of the condition and maintenance of railway assets with special reference to safety in train operation. The reduction or otherwise in the incidence of consequential accidents is an index of safety in train operation so far as the public are concerned and this has already been dealt with in the previous chapter. In this chapter, some of the observations made by the officers of the Commission, within the curtailed scope of periodical inspection, as mentioned in Chapter II, are brought out under various categories, such as, formation, curves, permanent way, signalling, bridges, etc. The level of maintenance has essentially to be judged from instances of shortcomings and features typical of the general condition. With this in view, such of those observations that have an important bearing on safety and reflect upon the general trend of maintenance have been brought out in this chapter.

The reports of Additional Commissioners of Railway Safety and Deputy Commissioners of Railway Safety in the Technical Wing of the Commission on various aspects of railway working are duly communicated to the concerned Railway Administrations for their information and necessary remedial action. From the observations summarised below, it will be seen that there is considerable scope for further toning up the maintenance of assets and the operation of trains to ensure a safer service.

A. FORMATION

Central Railway

Faridabad-Jhansi section :

Bad bank at km. 1260/0-1 was made up of Kankar mixed with clay and was 3 to 4 m high. It was reported that there were many slips on this bank in the past. It was also stated that sand-blanketting was done without much relief. It appeared that the bank could be improved by designing a proper profile with compound slopes and providing sub-banks on either side and improving the drainage. CST 9 sleepers provided on this yielding bank are most inappropriate and should be replaced by ST/Wooden sleepers as early as possible.

Km. 1232/0-1234/6 :

(a) The track was raised on the Up line at the time of ballasting. But neither the cess was made up nor the bank widened as required, with the result that the ballast was badly slipping down the slopes. It is very important that whenever track is raised, the formation should also be suitably widened and raised so that ballast may not be wasted and the track may not be weakened due to the slipping of the ballast.

(b) The same was the case at Kms. 1136—1191. In fact, this was a common phenomenon at a number of other places also on the sections inspected. Systematic attention is required to improve the formation.

Eastern Railway

Katwa—New Farraka Sahibganj—Sainthia Section

Low cess was noticed at Km. 141, 181, 238 and 114. No proper drainage was provided in the cutting at km. 222.

Tildanga and New Farraka—

Between Tildanga and B Cabin and near approach Home signals of C Cabin where frequent bank failures are taking place in spite of some remedial measures having been taken in consultation with RDSO to flatten the slope and also to provide stone drains, further remedial measures are warranted to stabilise the bank.

There was heavy damage to formation during the monsoon of 1978 between Rajbandh and Durgapur and heavy land slides in the cutting between Raniganj and Kalipahari and between Durgapur and Waria. While the traffic has been restored, the Railway may take further action for strengthening the breached portion by pitching and stabilising the cutting where slips occurred.

B. CURVES

Eastern Railway

Katwa-New Farraka Sahibganj-Sainthia Section

Curve No. 2 at Km. 238/15-9-9 OR-CST 9 Sleepers.—Against a theoretical versine of 32 mm and superelevation 30 mm, actual measurement showed versine varying from 19 to 34 and superelevation from 20 mm to 33 mm. Curve should be realigned and recanted.

South Eastern Railway

12° and 14° reverse curves at Km. 1187/2-3 on Chhindwara-Nainpur Section: were laid with 60 lb. rails on wooden sleepers to N+3 density with single key A.C. bearing plates on 1 in 80 gradient. Some keys were driven in opposite directions on the same sleepers and at some places in the direction of up-gradient serving no purpose. The versines and super-elevation were found to be irregular at the junction of these reverse curves.

Central Railway

Faridabad-Jhansi Section :

3° Curve at Km. 1220/9-10 (theoretical versine : 86 mm. superelevation : 115 mm : speed permitted : 90 Kmph).—(i) This curve was provided with a transition length of 90 m only at Delhi end and 110 m at Jhansi end.

(ii) The keys on S.T. sleepers of LWR on this curve were wrongly driven in opposite directions on alternate sleepers in the middle of the LWR. Even on the breathing lengths, keys were driven in opposite directions alternately instead of driving 25% against traffic and 75% in the direction of traffic. Action should be taken to set right matters.

(iii) The ballast was found choked with mud as obviously no screening was done for a few years. The drainage should be improved by screening the ballast at least on the inside of the curve.

(iv) The PWI checked the curve in 9/78; but no follow-up action was taken by him to rectify the defects noted by him.

(v) The transition portions of the curve were not properly maintained both in respect of super-elevation and versines.

(vi) Versines were not painted on the rails for ready reference. This should be done invariably in respect of all curves.

C. TRACK MAINTENANCE

N. F. Railway

The track renewals of the NF Railway are very much in arrears. The incidence of rail fractures has gone up very considerably in the Furkating-Gauhati section. Attention of the Railway Board is invited to this so that the supplies of track material required by the Railway are arranged expeditiously and the requisite funds made available to complete the renewals.

Central Railway

CWR between Faridabad & Mathura Station.— The C.W.R. was carried through small span girder bridges and wooden sleepers were provided at approaches to these bridges to accommodate guard rails, whereas the main track structure had concrete/S. T. sleepers. The

ballast section on the approaches to the bridges was found to be deficient due to trespass etc. This may lead to buckling of track due to insufficient lateral strength during hot weather. Special care is needed in maintaining the ballast section at the approaches.

South Eastern Railway

*Km. 1165/5 to Km. 1140/6 on Chhindwara-Nainpur Section.—*This length was laid with 50 lb. ASCE rails. The rails were badly hogged and the joints were low leading to rough running. It appeared that the rails are permanently damaged. It should be examined whether any dehogging can be done to prevent damages to the rolling stock. At present the dog-spikes are butting against the angle fish-plates instead of the rails. It may be examined whether they can be made to butt against the rails by notching in the legs of the angle fish-plates.

Eastern Railway

Ballygunge—Diamond Harbour Section :

Encroachment of land on both sides of track in South Section is affecting track maintenance. Supply of points and crossings for replacement is poor. Progress of training out of ballast is very poor. As against programmed quantity of 20 lacs c.ft. in the Current year only 1.5 lacs c.ft. has been trained so far.

Permanent way gangs are not provided with metallic jumpers for bridging rail fractures. They are also not yet given shock treatment charts.

D. POINTS AND CROSSINGS

Eastern Railway

*Points No. 19E at Sahibganj—1 in 12—90R—90R—Wooden layout.—*Right hand tongue rail chipped and required replacement; stock rails also worn; gauge on switch portion 6 mm slack; wear on nose 6 mm; 2 crossing bolts found loose; sleeper under nose of crossing bent down; Lead curve is sharper than 4°; ballast cushion inadequate: Point was not inspected by PWI in September 1978.

*Madhupur-Diamond crossover P 31. 1 in 8-1/2 double slip.—*Cess should be lowered on both sides to improve drainage. Stock rails are worn out and require replacement. Tongue rail is in good condition. Gauge, level and clearance are within limits. Heel bolts are loose and bent. Wear on crossing is 4 mm. One obtuse nose is getting hit by flange of vehicles due to point rail clearance being tight by 3 mm. Correct clearance should be provided. 50% of obtuse crossing bolts are loose. Asansol end acute crossing clearance was tight by 2 mm, and wear on crossing and wing rail are 4 mm and 6 mm respectively. The diamond crossing is due replacement. Last inspected by PWI on 8/78 and AEN on 11/78.

Asansol—Points No. 28-90R-1 in 8-1/2 steel layout.—Tongue rails were in good condition but stock rails were worn. 3" closure rail has been provided ahead of stock rail joints which should be replaced by correct length of rail. Gauge slack upto 4 mm and cross-level out by 6 mm. 1 crossing bolt loose and 2 keys missing and 5 keys loose. Wear on crossing 5 mm and wing rails 2 mm. At the heel joints all bolts were bent and the alignment was poor.

N. F. Railway

Point No. 14 in Lanka station yard on Lumding-Gauhati Section (1 in 12 turnout).—This is a 1 in 12 turnout laid in 1970. The wear on the nose was 10 mm and on the wings 10 mm and 8 mm on left and right wing-rails respectively. The cross levels were out by 6 to 10 mm at some locations which should be rectified. The gauge varied from exact to 1 mm tight. The check rail was slightly loose. The crossing needs reconditioning. Packing on the approach of the turnout needs attention.

Central Railway

Points No. 17-B at Morena.—were laid with 52 kg rails on steel sleepers. The right tongue rail was badly worn out and should be renewed.

(ii) 25 mm ballast should be inserted since the points are on a run-through line.

(iii) There was an excessive gap at the heel of the crossing on the straight portion and the same should be adjusted to avoid damage to the crossing.

1 in 8½ Points & Crossings on passenger lines.—(i) The Working Time Tables indicate that 1 in 8-1/2 Points & Crossings still exist on running lines where passenger trains take the turnouts at certain stations of Central Railway. But the actual point numbers are not indicated anywhere in the Working Time Tables.

(ii) There is no direction to the Drivers that they should observe a speed restriction of 8 km/h over such turnout.

(iii) No speed restriction boards were also erected at sites of such points as seen during the Inspection.

(iv) The position should be reviewed on the entire Railway in order to put the same on a sound footing.

E. GENERAL

South Eastern Railway

Gang No. 16 at Km. 1217 on Chhindwara-Nainpur Section.—consisted of 1+1+6+1 LR men and was in charge of the length from Km. 1213/12 to 1219/7.

Their tool box was situated at Km. 1216/7-8 (Samaswara) without any watch. This is not at all desirable in view of several sabotage and attempted sabotage cases reported on Indian

Railways in the recent past. A programme should be drawn up to shift such tool boxes to places where there is some watch.

Accidents on the N.G. sections of Nagpur Division have been generally on the increase in the last few years with a climax in the year 1978. The accidents are mostly due to mid section derailments and particularly during monsoon months.

North Eastern Railway

Kanpur Anwarganj station.—There is only one platform with a scissors cross over to berth two passenger trains at a time. The Platform berth at the Agra Fort end does not have arrangements for overhead watering and for this reason it appears that even Express trains are received on the Non-Platform line when the other platform berth is occupied by a train. It appears desirable to have overhead watering arrangements on both the berths of the platform line so that passengers are not inconvenienced due to this handicap.

Inspection of Kasganj Station on 2-9-1978.—It was learnt that the First fireman of the steam engine of the shed were not undergoing "Learning the road training" as per rules. In terms of General Rules the first Fireman is required to be alert throughout the journey and as per Administrative instructions he is required to sight the signals and assist the driver in the process. This he cannot do unless he is thorough with the section where he is working. The Railway Administration may look into this matter and arrange for the Firemen also to learn the road in the interest of Safety.

Central Railway

The incidence of accidents on Jhansi Division had considerably gone up in 1978 when compared to 1977, as can be seen from the following:

	Year	
	1977	1978
1. Derailment.	24	31
2. Collisions	2	3
3. Averted Collisions	1	2
4. Drivers passing Signals at Danger	0	3
5. Fires on trains	0	2
6. Accidents at Level Crossings	5	5
7. Train Partings	8	22
8. Block irregularities	1	3
	41	71

Eastern Railway

Ballygunge-Diamond Harbour Section

Critical Implantation Register.—There are 36 cases of implantation less than 2.35 metres out of which 8 cases are on the section inspected.

Vulnerable Foundation Register.—Not being maintained.

F. LEVEL CROSSINGS

N. F. Railway

Level Crossing No. ST 44 at Km. 159/5-6 on Lumding-Gauhati Section.—The level crossing is provided with only a chain and pad lock for closing against road traffic. As it appears to be a busy level crossing, proper gate leaves or lifting barrier should be provided. The level crossing was last overhauled on 29-10-76. In the absence of standard gate leaves or lifting barriers, gate lamps have to be manually operated. Only 10 detonators of 1977 and 1978 were provided. The visibility conditions for a road vehicle of an approaching train was not very satisfactory. The gauge was 2 mm slack but the cross levels were out by about 15 mm. Two check blocks were loose. The sleepers on the approaches required packing.

Central Railway

Level crossing at Km. 1263/9-10 on (Faridabad-Jhansi Section).—is a 'B' class level crossing in the heart of Morena town and is provided with lifting barriers operated from the end cabin.

(ii) The width of the gate is only 5.5 m and is not sufficient for the amount of traffic passing through the same. This should be converted into a special class level crossing with at least 24 ft. wide gates.

(iii) The road surface was in a very bad state and should be improved.

(iv) The check rails were higher than the running rails. The worn-out running rails should be renewed.

N. E. Railway

Inspection between Kanpur and Hathras by 17 Up Express.—Level Crossing No. 131 in Km. 118/119 is located on a curved approach with very limited visibility. As per the traffic census available with the Assistant Engineer, 3388 vehicle units pass through the level crossing in 24 hours. It would be desirable in the interest of safety to provide a telephone at the level crossing and introduce the system of exchange of private numbers between the Station Master and the Gateman.

'C' class Level Crossings No. 46 and 47 between Haldwani and Lalkua had no provision for gate lamps. There is considerable motor traffic through these gates, as stated by the PWI and non-provision of gate lamps is a violation of the provision of the Way and Works Manual. When questioned on this point, the DEN appeared to be unaware of the corrigendum No. 91, dated 27-1-70, to para 1601, Annexure I, item 6(a). This requires to be looked into urgently and rectified. A

separate D.O. letter has been addressed to CE/NE Railway on this subject.

Interlocked level crossing No. 32 A at Km. 43/5-6 was checked. The motor traffic through the level crossing appears to be very heavy and at the time of inspection trucks and buses were seen crossing each other at the gate with great difficulty since the available road-way between rail stakes was only 16 ft. It is necessary to increase the width to atleast 24 ft. and it will be an additional facility if lifting barriers replace the swing gates.

South Eastern Railway

Unmanned level crossing at Km. 1224/13 on Nainpur-Howbagh Section is situated between Home and Outer signals of Howbagh station within Jabalpur city limits. There is heavy road traffic through this level crossing. Visibility is also poor on either side. The level crossing should be manned in the interests of safety.

G. BRIDGES

South Eastern Railway

Bridge No. 75 at Km. 1187/4 (1×6' RC slab) on Chhindwara—Nainpur section.—The danger mark was not properly and conspicuously marked. The earth behind the splayed wing walls was cut endangering the approaches to the bridges. The approaches should be protected by constructing proper retaining walls.

Bridge No. 151 at Km. 1123/9-10 (1×12' Girder) on Nainpur—Howbagh section.—(i) This was last painted in 6/76. But the painting was of a poor quality. Re-painting is required.

(ii) The general condition of bridge was sound.

(iii) There was a deep scour on the down-stream side of the bridge giving an indication that there might have been undesirable afflux on the up-stream side. The scour should be filled up.

(iv) The danger level was marked 0.9 meter higher than the HFL. Since there appeared to be undesirable afflux in the past, the danger level should be brought down to the same level as the HFL which the bridge withstood without any damages.

Central Railway

Faridabad-Jhansi Section :

Bridge No. 4 at Km. 1475/15-14 (1×12.2m G. B.).—(i) The top flange plate of the left girder on the down line had cracked at a few places and temporary supports were given to the same by inserting wooden sleepers between the top and bottom flanges. This is not a satisfactory arrangement. This girder should be renewed without any delay.

(ii) Pending this, a speed restriction of 50 Km/h may be imposed to start with and if there is any further development, further restriction may be imposed.

(iii) This is a glaring example of engineers taking undue risks by not imposing speed restrictions when warranted. This kind of complacency on a route, where Double headed TN/AP/KK Expresses are running, should be discouraged.

(iv) The FSL was just at the bottom of girders. It is not known whether there are any problems during the monsoon season due to HFL going up. This should be looked into.

(v) The approaches to the bridge on the Up line were provided with wooden sleepers to accommodate guard rails. The ballast was found to be badly slipping on the cess side. A toe-wall should be provided on the cess side to protect the ballast section.

Bridge inspections by AENs :—One of the bridge inspection registers of Mathura sub-division was scrutinised. The remarks against road over-bridge No. 1438/2 (3×9.15 m span girders + 2×6.10 m arches) indicated that the load bearing troughs under the road at Delhi end were badly corroded needing heavy repairs. These remarks were repeating since the year 1974; but no follow-up action was taken to rectify the same. The BRI was not even aware that such a work had to be taken up and pleaded that he took over the section only recently. This shows that proper follow up action is not being taken on the bridge inspection notes by the Engineering Officers. The DEN should have better control.

Bridge No. 1412/2 (2 × 1.52 m Arch) on Up Line :—(i) There was a transverse crack in the arch in the Delhi end span. The face wall had also cracked up. The reason for this might be differential settlement of the Delhi end abutment. The track was raised to give more cushion and relieve the stress on the arch; but this led to another evil of affecting the face wall. The arch was built in brick masonry the present strength of which is unreliable. The FSL of the canal is also 6" above the crown of arch. The weep holes in the spandrel portions were not functioning at all.

(ii) Wooden sleepers were provided on the arch portion. But the ballast section on the shoulders was much depleted due to trespass. It is dangerous to have short lengths of wooden sleepers in an otherwise metal sleepered track and that too where LWR is laid. Proper ballast section should be ensured on the shoulders to prevent buckling of track. Wooden sleepers are also not required on the arches which have sufficient cushion. Attention is drawn to Railway Board's Circular No. 71/W6/TK/19 of 18-1-72 wherein instructions were issued not to have short lengths of track with wooden sleepers. In any case, it should be ensured that such

lengths are provided with full ballast section, if they cannot be avoided.

The Railway was not in a position to certify the strength of bridges, most of which are aged, even in terms of clause 24 of the Bridge Sub Structure Code, while sending proposals to run Double headed Tamil Nadu/A.P./K.K. high speed express trains with a trailing load of 21 coaches and obtained special dispensation from the Board subject to critical bridges being kept under watch. Limited inspection has revealed that sufficient attention is not being paid to safety aspects and local engineers are taking risks by not imposing speed restriction where warranted. There should be no inhibition to impose speed restriction on condition basis, in the interests of safety.

Eastern Railway

Ballygunge—Diamond harbour Section :—No bridge inspection has been done after the monsoon of 1978. Last year in April 1978 bridge inspection was done by Assistant Engineer and the registers were sent direct to the head office who returned the registers for resubmission after the scrutiny by DEN/Sr. DEN. This is yet to be complied with. Bridge inspection has therefore fallen in arrears by nearly 2 years. Bridge inspection should invariably be done before December and all the repairs carried out before the next monsoon. Suitable instructions and time schedules may be fixed and all concerned advised. There is also some confusion in regard to the scrutiny of these registers in the head office. The level at which these registers are to be scrutinised may also be laid down and suitable instructions given.

Jasidih-Andal Section-Bridge No. 509-4 × 60' Girders at Km. 212/18-21 :—Double spiking was not done on a few sleepers on the inside of guard rail. On the Down line bridge a number of sleepers required replacement. Sleeper spacing at rail joints on the bridge is more than permissible limit. On the Down Slow line the guard rail ends have not been properly ramped down. Girders were last painted on 12/73 and greased on 8/76. Repainting is overdue.

H. SIGNALLING

Eastern Railway

New Farakka :—Block instrument on Chamaran side is failing frequently. Investigation should be made at higher level and remedial action taken. The ASM stated that the track circuits A, B, C fail very frequently but this is not supported by entries in the signal failure register. It is stated that the rectification is being done by signal staff. This also requires investigation at higher level to find out the cause and take suitable remedial action. There is frequent stabling of loads at the station due to non-acceptance by N.F. Railway. It appears

desirable to track circuit the goods lines in the yard in the interest of safety. The operation of Outer signal of B Cabin was reported sluggish. In the 'D' cabin the Outer signal was not visible but no repeater was provided.

Arrears in overhauling in lever frames in Howrah Division:—One lever frame was in arrear for more than 3 years, 44 frames more than 2 years, an equal number for more than 1 year and 53 frames less than 1 year. Action should be taken to liquidate the arrears. Six token instruments are overdue POH on the entire division.

Madhupur West Cabin:—Obstruction test was done on point No. 39 and found satisfactory. There was no pull chart in the West Cabin. Branch Outer was not clearly visible from the West Cabin. The obstructing tree should be cut or repeater provided. Block instruments of branch line were overhauled in 12/66 and therefore overdue POH.

On the entire Division 3 lever frames are overdue POH for more than 4 years, 4 lever frames overdue POH for more than 2 years, 6 lever frames overdue POH for more than 1 year and 16 lever frames overdue POH for less than one year, 6 block instruments are overdue POH in the entire division. 16 token instruments are also overdue POH in the Division.

N. F. Railway

Furkating:—The Advanced Starter is not visible from the station. If shunting is being done from the Goods Shed side, it may not be possible to check if the line is clear for the departure of a train before the signals are lowered. This should be looked into so that the non-occupation of the line can be confirmed before despatch of train.

It was observed at some stations that even after the Home signal went back to ON, the Distant signals continued to be OFF. Apparently the reverser was not working. This should be checked and rectified.

Dinapur station of Furkating-Lumding Section:—There were 10 signal failures at the station during December, 1978 which appears to be very high. Four of them pertain to the up Home Signal alone. The reasons for the same should be investigated and suitable action taken.

Central Railway

Mathura Junction:—The main lines are track circuited for limited lengths only. There are long lengths between C&D Cabins and A&B Cabins, where trains move on the strength of slots only. It is essential that these portions should also be track-circuited. In fact, track circuits at this station should cover the entire station section in view of the importance of this

junction and complicated movements under restricted visibility conditions.

Kotra Station:—The Starter Signal of the Up loop at Bombay end was seen hidden by wagons standing on a siding due to the Up loop having reverse curves. A Driver of a train standing on the up loop is likely to mistake the main line starter as pertaining to him and start on wrong signals, trail through points and enter the Block section without proper authority. Something should be done to avoid this contingency by improving the visibility of the loop Starter signal.

Sonagir Station:—The Block Section limit board at Delhi end was wrongly fixed far away from the fouling mark of the trailing emergency cross-over points. The same should be shifted nearer to the fouling point.

Signals on the sections inspected:—(a) Multi-Aspect Colour Light Signals are being provided from the Delhi end, followed by Lower Quadrant two-Aspect Signals with Warners detached from Outer at some stations and without detachment at a few stations and without any Warners at all at some other stations. These are followed by MAUQ signalling. There are islands of L.Q. Signalling in MAUQ territory.

(b) Standard I signalling still exists at some stations.

(c) It is rather disappointing that so many varieties of signals should exist on an important high speed G. T. route where Express trains are running at 120/110 Kmph speed. Some uniformity in signalling is needed. Standard I Signalling should go.

South Eastern Railway

Traffic level crossing at Km. 1259/9 on Chhindwara-Khirsadah Section:—This is a special class partially interlocked level crossing manned by 3 men, in 8 hours shift each.

No signal has been provided for the protection of the level crossing when trains are dispatched from Chhindwara station while the gate is interlocked with the Outer Signal on Khirsadah side. There should be at least exchange of private numbers between the Gatekeeper and the Station Master for the dispatch of trains from Chhindwara station.

Chhindwara:—The Home signal on Khirsadah side was found on the Chhindwara side of the level crossing at Km. 1258/9 at site, whereas the same was shown as existing on Khirsadah side of the level crossing in the Working-Rule Diagram.

(ii) The shunting limit board was shown as existing on Chhindwara side of the level crossing in the Working Rule Diagram whereas it was actually on Khirsadah side of the level crossing.

(iii) The Working Rule Diagram did not thus correctly reflect the existing location of signals and shunting limit board. The same should be corrected.

(iv) In the Working Rule Diagram only minimum distances were given for inter-signal distances instead of the actual distances.

Visibility of Signals :—It was understood that no standards were laid down in regard to the minimum visibility to be maintained for various signals on the N. G. system. This needs to be looked into and correlated with Emergency Braking Distances. The standards should be laid down by the Headquarter office.

Kamalur Station.—(i) The panel interlocking done is of the Austerity type, i.e., there is only track circuiting and interlocking of the points and signals. The running lines are not track circuited. The SM/ASM has, therefore, to personally ensure the line is clear before he receives a train or allows it to run through. This Austerity Interlocking permits of signals being lowered for another train from either direction on an obstructed line. Thus, if there is a failure of one person only i.e. SM/ASM on duty, accidents can happen.

Out of 29 stations on the K. K. section where Panel Interlocking has been sanctioned, 10 have already been done adopting this Austerity system. Paucity of Wooden sleepers is reported to be the reason for introducing austerity instead of a full Panel Interlocking on this section. It appears advisable to review the policy of switching over to a system of interlocking where human failure of one person against three in the earlier system can result in accidents on this heavily graded section.

I. OPERATION

N. E. Railway

Kanpur Anwarganj Station :—The equipment of the Guard of 10 Da Express which was standing on the platform was inspected. It was surprising to learn that the Guard had no General Rules Book with him. Surprisingly enough he had a copy of the 1978 edition of the New General Rule Book which has not yet been brought into use. On being questioned he expressed ignorance as to whether new General Rules Book was brought into use on the Railway or not. His accident Manual did not contain any correction slips. His equipment was alright except that his portable telephone and the emergency electrical equipment were placed in the SLR at the other end of the train. This was stated to be for the reason that there will be a change of direction at Lucknow Junction. Even in such a case, it is desirable that the equipment is with the Guard and when the direction of the train is changed the equipment should move to the other end alongwith the Guard's Box.

Haldwani.—The periodical thorough inspection of the Station which is the responsibility of the T.I., was overdue by 2 months, the last inspection having been conducted in April 1978. It was stated that no relief worked in place of the T.I. who was on sick leave for some period.

One of the observations of the T.I. during his earlier inspection in April 1978 was about the difficulty in complying with the Station Working Rules for exchange of signals between the pointsman and the gateman at L.C. No. 52 for reception and despatch of Down trains. There is no indication anywhere in the records as to what action was taken on this important observation.

The Station Working Rules do not appear to have been correctly worded in this respect. At P 9 of the rules it is stated, in the context of reception of Up trains from Lalkua, that "the pointsman at the trailing end will set the proper route and exchange alright signals with the gateman at LC No. 52C". This should be the function of the pointsman at the facing end as stated in Annexure I para 5(a) wherein it is provided that "the pointsman at the respective end of the yard is responsible for keeping the gateman informed of the expected movement of the trains". Para 8 of the Working Rules needs revision, correctly specifying this function.

Central Railway

Refresher Courses.—The following staff were stated to be overdue Refresher Courses on Jhansi Division as on 31-12-78:

Category	No.
(a) SMs and ASMs	171
(b) Guards	38
(c) Drivers, Firemen, etc.	87
(d) Cabinmen, etc.	96

It was understood that there were as many as 48 vacancies in the category of ASMs on the Division with the result that ASMs could not be sent for Refresher Courses in time. The position may be as unsatisfactory on other divisions also. This needs to be looked into.

Faridabad.—The same kind of paper line clear tickets is being given for the Down line as well as the 3rd line. It is advisable to have tickets with different colours/strips for different lines to avoid any misunderstanding on the part of Drivers and on the part of station staff.

N. F. Railway

Hojai station on Lumding-Gauhati section.—Shri K. P. Choudhuri, ASM was overdue refresher course as also first aid. The Station Master was also overdue first-aid course. It was understood that for first-aid training the staff are sent to the Divisional Hospital at Lumding. Since there is a Health Unit at the station, it

should be possible for the first-aid training to be given by the Doctor of the Health Unit which will avoid inconvenience to staff as also avoid back-log in this respect. The station was last inspected by the Divisional Safety Officer on 28-7-76. The station was allotted to the AOS for inspection but the Inspection Register did not indicate any inspection since January, 1973 by him.

Eastern Railway

Katwa-New Farakka Inspection—Refresher Course.—The arrears for refresher course as on 1-12-78 were 44 in senior transportation grade, 30 guards, 71 switchmen and 240 Levermen/Cabinmen. The Division is finding difficulty due to lack of trainee reserve posts in different categories. It was stated that the Leave reserve is hardly sufficient to cater for shortages. Efforts should be made to create trainee reserve posts to wipe out the arrears.

Ballygunge-Diamond harbour section—Vacancies.—There are 82 vacancies of Cabinmen Gr.II/Levermen, out of total strength of 296. Difficulties are being experienced in filling up by promotion from pointsmen in Grade Rs. 200-250. An early solution should be found by the Administration.

Jasidih-Andal section—Wrong marshalling.—The front SLR of 2 Dn which crossed on 30-1-1979 was wrongly marshalled with the luggage portion trailing instead of leading. The rear SLR of 319 Up was wrongly marshalled.

J. LOCOMOTIVES & ROLLING STOCK

South Eastern Railway

N. G. Sections—ZDM—3 Locomotives.—It was understood that 5 numbers of ZDM-3 locomotives were fitted with a gear ratio for a maximum permissible speed of 40 Km/h only while the running 4 were fitted with a gear ratio for a maximum speed of 50 Km/h. It is regretted to note that this point was not mentioned at all when the safety certificate to run all the ZDM-3 locomotives at a maximum speed of 50 Kmph was submitted. Thus sanction was taken for a maximum speed of 50 Km/h in respect of all locomotives by keeping it in darkness in regard to the gear ratios. If any locomotives are to ply at a more than 40 Km/h, fresh sanction should be taken explaining how the two types of ZDM-3 locomotives will be distinguished and deployed. Meanwhile ZDM-3 locomotives should not be used to haul passenger trains which are 45 Km/h and the maximum permissible speed in their case should be limited to 40 Km/h.

ZE class steam locos.—The deflection in the empty condition on the rear springs is very low even under static conditions. This works out as follows:

$$2.95/2 \times 0.314'' = 0.46''$$

Normally a twist of 1/2" is permitted in track and it is not possible to reduce this twist with manual maintenance of track. Conditions will still be worse on transition curves, where even with the permissible cant gradient of 1 in 720, the natural twist works out to 0.16 per 10 ft. Thus there is an inherent weakness in the design of the tender springs which do not suit the normal state of track in respect of twist.

North Eastern Railway

Kathgodam.—KML-2 Down, a goods train which was ready to leave Kathgodam having been checked for its brake power it was found that 26 out of 31 vacuum cylinders were active whereas the vacuum certificate issued by the TXR to the train crew indicated that 29 were operative. The vacuum levels of 38 cm and 28 cm on the Engine and Brake van respectively were correctly recorded.

The importance of Brake Power examination of trains leaving Kathgodam to negotiate the steep falling gradients on run cannot be over-emphasised. It is necessary that the brake power certificates reflect the true position to the Driver as otherwise he could be misled by the certificate and cause an accident.

The guard of 11 Up of 8th November had no vacuum gauge in his brake van. It is surprising that such a situation should prevail on an important Express train on a graded section while its non-availability even on a passenger train should be considered a safety risk. It was learnt that this was by no means an exception and that several trains were running without gauges. Evidence to this effect was seen in the books of the HTXR in respect of the following trains: 8 Up of 19-10-1978; 103 Up of 19-10-1978; and 102 Up of 20-10-1978.

The situation appeared to be serious meriting a probe at a high level and adoption of expeditious remedial measures.

Eastern Railway

Ballygunge-Diamond Harbour Section.—37 Motor coaches and 40 trolley coaches running on the Division are overdue POH. Efforts should be made to liquidate the arrears. There are 22 vacancies of Motormen out of a total strength of 225.

Hot Axles—Jasidih-Andal Section.—There were 1177 cases of hot axles during the year upto December giving an average of 0.10 hot axles per train. The total number of hot axle cases due to avoidable defects during December 1978 was 26 against 24 in December 1977 and 14 in November 1978. The reasons for the increase of hot axles may be analysed and suitable remedial action taken.

Electric loco Shed at Asansol-Jasidih-Andal Section—Implementation of 10 hour rule.—The percentage of crew who performed duty in

excess of 10 hours between 10 to 12 hours was 10.6% in August 1978, 9.4% between 12 & 14 hours in the same month and 6.2% in excess of 14 hours in the same month. Action may be taken to reduce staff performance of duty in excess of 10 hours and completely eliminate performance of duty in excess of 14 hours.

Failure of Electric Locos.—The main reason for frequent failure of WAG-3 and WAG-4 locos is the failure of elastic gears. Cases of failures of intermediate pinion on WAM-1 locos and axle box failures on WAM-1 and WAM-2 locos have come to notice. There were 35 cases of traction motor failures in 1978 against 47 failures during the previous year. The Railway may pursue the matter in consultation with the RDSO where necessary.

K. MEASURES FOR DEALING WITH ACCIDENTS

South Eastern Railway

ARME-Scale I.—Equipment exists only at Motibagh for the entire N. G. system while scale II equipment exists at Nainpur Chhindwara and Nagbhir stations. The Scale I equipment at Motibagh cannot reach the entire N.G. system

within a reasonable time. One more Scale I equipment should be kept at Gondia which is a central place both for North and South Narrow Gauge systems of Nagpur Division.

ARME Scale II Equipment at Nainpur.—
(a) It was kept in 2 Nos. of LAS type wagons. There was no evidence to show that mock-drills were being conducted regularly.

(b) A fake message was issued that Satpura Express met with an accident. The hooter was sounded at 9.58 hours. Paramedical staff turned up by 10.00 hours. A shunting engine tender foremost with a 4-wheeler brakevan, attached to it was sent to work the ARME Vans. It is to be pointed out that by attaching a 4-wheeler brakevan the speed gets reduced to 30 Km/h and as the engine has to run tender foremost, the speed gets further reduced to 25 Km/h. Moreover a shunter who was not conversant with the section was booked to work the special. Such lapses can cause abnormal delays in taking ARME vans to sites of accidents. The position can be improved only by conducting frequent mock drills coordinated at adequate level.

NOTE.—The Railway Board have intimated that some of the Railways have reported compliance with the observations made above.



CHAPTER V

GENERAL REMARKS ON SAFETY ASPECTS

5.1 Upkeep of speedometers and speed recorders in locomotives

Arising out of numerous instances of inadequate upkeep of speedometers and speed recorders on locomotives which came to notice, the Commission of Railway Safety, apart from drawing the attention of the Railway Board and Railway administrations to such infractions through inspection and inquiry reports, also commented on this feature in its annual reports for 71-72 to 73-74, 75-76 and 76-77. It is a matter for regret that there has been no improvement in this respect and cases continue to come to notice of speedometers incorrectly calibrated, tachographs for recording speed on the run being either deficient or improperly inserted, even used tachographs being fitted instead of fresh ones, etc. While, on the one hand, most of the existing type of speedometers-cum-speed recorders in use do not appear to be of the right type for use on locomotives and are therefore prone to frequent failures, it is difficult on the other hand to appreciate why the machinery for fixing and renewing charts and calibrating speedometers should be sub-standard. It is necessary that the Railway Board bestow their earnest consideration to the evolution of a suitable type of speedometer-cum-speed recorder for fitting on locomotives and also ensure the toning up of machinery for their maintenance on the Zonal Railways.

In this connection the Railway Board have remarked as under:

"Regarding the maintenance and upkeep of speedometers and speed recorders, instructions already exist for:

- (i) Re-calibration of all speedometers once a year preferably at a central place, where facilities are provided.
- (ii) Checking all speedometers once a month, preferably by timing with a stop watch.
- (iii) Regular checks of speed recorder charts in order to keep proper control on over-speeding by drivers.
- (iv) Conducting detailed checks on some of the charts selected at random to detect any lapse on the part of drivers in adhering to starting/stopping, speed restrictions etc. and tallying the reading of the chart with the entries in the drivers' journals.
- (v) Setting up a Central Speedometers Repair Organisation on each Railway where 20

per cent spare instruments, and spare cables, gear boxes etc. are to be stocked.

"The above instructions were again brought to the notice of the Chief Mechanical Engineers in their conference held at Madras in December, 1979.

"Additionally, instructions regarding the mode of changing of speed recorder charts have also been issued vide Board's letter No. 77/M (M&P)/467/7, dated 19-1-1980 in which the responsibility of changing the charts has been placed on the Drivers themselves and suggesting the precautions to be taken to prevent tampering with the equipments by them.

In regard to evolving of a suitable type of speedometer/speed recorder for locomotives, it has now been decided to provide imported Hasler speedometers on all new diesel locomotives being manufactured, as the efforts to improve reliability of VDO speedometers have not been fruitful. Simultaneously action has already been taken to develop the electronic speedometers with M/s. International Instruments Ltd., Bangalore and with M/s. E.C.I.L., and an electric speedometer with M/s. Set & Dey. Provision of a suitable indigenous speedometer is largely dependent on industrial infra-structure available in the country and all efforts are being made to hasten it to the extent feasible."

5.2 Over-loading of Wagons

The Railway Board in their letter No. T.C.I./1294/75/1, dated 10/17-12-75 issued instructions that subject to certain conditions 4/6-Wheeler wagons may be over-loaded to an extent of 2 tonnes each and bogie-wagons with certain exceptions to the extent of 4 tonnes each on B. G. etc. These instructions were neither endorsed to the Commission of Railway Safety, nor was it consulted in the matter. The RDSO which had occasion to go into this subject rightly pointed out, vide its letter No. MW/MK, dated 21-6-1976 addressed to the Railway Board, that the practice of overloading wagons beyond design limits was detrimental to the wagon running gear as also to the sub-structure, i.e., track and bridges. These instructions, however, remain unamended and one of the Railways, viz., the S. E. Railway has gone a step further and issued instructions that on certain sections no load adjustment should be done even if over-loading is detected at weigh-bridges. The Railway Board who were requested by the Commission to reconsider their instructions in the interest of safety, have not done so and have

merely clarified that instructions have been reiterated to Railways to strictly observe the axle load restrictions vis-a-vis the provisions contained in Rule 163 of the Goods Tariff.

5.2.2 It is pertinent to note that the axle load of each type of wagon is fixed, based on its design features including its strength, riding qualities, centre of gravity, its effect on track and so on. Each type of wagon is cleared for operation at specified speeds based on the safety certificates submitted by Railways, which are in turn based on the design axle loads. As such, Board's instructions which amount to design axle load of wagons being exceeded vitiate the basic principles of design.

5.2.3 For instance, the maximum design axle load (including tare weight and pay load) permitted in the case of a CRT wagon is 20.32 tonnes. As per Board's relaxation, this axle load can go upto 21.32 tonnes provided the axle load permitted on the section is not less than 21.32 tonnes. Board's relaxation has the following implications:

(i) The Design axle load is permitted to be exceeded by 1 tonne by-passing the relevant technical considerations. This load is likely to be further exceeded when the contents of a wagon get wet during monsoon, etc. This excess weight has undesirable effects on the wagon itself, its riding qualities and its stability. This, in turn, has deleterious effects on track. Rails are overstressed and their stamina to withstand fatigue gets undermined in the high stress ranges due to increased axle loads and their repetitions. Further, overloading has a telling effect on brake-power also.

(ii) Certain sections are, for instance, cleared for 20.32 tonnes axle loads. Even then, wagons with axle loads upto 21.32 tonnes and beyond are permitted because the loading stations have no idea of the axle loads permitted on the entire route traversed by those wagons. For instance, the axle load permitted on Cuttack-Paradeep line and Panskura-Haldia line of S. E. Railway is only 20.32 tonnes. But wagons with axle loads beyond 20.32 tonnes are being permitted by S. E. Railway.

5.2.4 It is, therefore, necessary that design axle loads, based on which wagons are cleared, should under no circumstances be exceeded. This is also advice given by the DSO.

The Commission would accordingly urge that the subject may be urgently reconsidered by the Railway Board so that the seeds of danger which are inherent in the extant instructions may not sprout with disastrous consequences.

On the above, the Railway Board have advised as follows:—

"It may be clarified that in respect of a number of commodities, the revision of minimum weight condition to carrying capacity plus 2

tonnes was undertaken during 1975 after detailed examination of all the implications. The prime consideration behind the revision orders of 1975 was to prevent loss to the railway revenues amounting to crores of rupees and to augment the earnings without jeopardising safety. Experience prior to the revision showed that the railways were in fact carrying the extra weight above the carrying capacity for years due to consignors utilising the loading tolerance of 2 tonnes above carrying capacity more or less regularly. All that the Ministry of Railways did in 1975 was, therefore, to permit the railways to charge for the overloading upto 2 tonnes, which was till then being carried free by them as a loading tolerance. Simultaneously with these orders, no loading tolerance over and above the carrying capacity plus 2 tonnes has been given. Such being the case, these orders did not permit the consignors to overshoot the limit of carrying capacity plus 2 tonnes which was also the position prior to the issue of these orders.

"Adequate safeguard has been provided in Rule 163 of Goods Tariff under which the minimum weight condition of carrying capacity plus 2 tonnes automatically gets reduced to the limit of loading due to restrictions warranted by local and other conditions. Added to this are the penal provisions of Rule 161 of the Goods Tariff laying down charges at double the highest class rate being recovered for the distance such over weight is carried in case of over-loading of a 4 wheeler in excess of 1 tonne or a Box wagon in excess of 2 tonnes.

"In the above back-ground Ministry of Railways find it difficult to view the revised minimum weight condition of 1975 as an infringement of safety rules.

"The entire issue is, however, being studied again in depth in consultation with RDSO and the Commission of Railway Safety would be advised further after a decision is taken."

5.3 Vacancies in Operating Cadre

It has been observed by the Commission, time and again during its inquiries, that prolonged vacancies in train passing categories, such as, ASMs, Switchmen, Levermen & Points-men have resulted in the adoption of improper and shortcut methods to keep the trains moving. While it is appreciated that the wheels have to be necessarily kept rolling, the vital fact that it should not be at the cost of safety should not be lost sight of at any level. Instances have been revealed in which the station staff were obliged to employ even untrained casual substitutes for train passing work on high speed routes. Such practices even for a short time could be disastrous, but these have apparently been going on as long-term arrangements since duly trained staff were not made available for replacement for a considerable time,

5.3.2 This malaise has been observed on more than one Railway. Therefore, it is necessary for the Railway Board to take note of this serious lacuna which is cutting at the roots of safety, and initiate, if necessary, a crash programme by which delays in recruitment, promotion and training could be cut down and properly trained staff brought into position expeditiously.

In this connection the Railway Board have intimated that the following action has been taken:—

"To remove the acute shortage in the categories of ASMs, Railway Administrations have since been asked to work out their requirements of vacancies and place indents on the Railway Service Commissions. The Railway Service Commissions have also been advised to give top priority to this recruitment. It has also been impressed upon all the railways to take immediate steps to make good the shortages, wherever they exist in various categories of operating cadre, particularly ASMs, Switchmen, Levermen and Pointsman."

5.4 Wheel and Axle Failures of Rolling Stock

Review of Section 83 Accident Reports submitted by the various Railway Administrations indicates that wheel and axle failures have occurred in numbers to cause great concern. As against 5 in 1977-78 there were 14 in the year under review. Some cases involved high-speed trains, such as, the Rajdhani Express and the Gomti Express. A list of accidents involving wheel and axle failures during the two year period of 1977-79 is at Appendix 'H'. The need is highlighted of improving the standards in maintenance shops and depots through a special drive to ensure that such happenings are minimised.

Railway Board's remarks are as under:—

"Instructions with regard to ultrasonic testing of axles already exist on the Railways. These have been reiterated emphasising that cent per cent ultrasonic testing of axles may be carried out during the P.O.H."

Sd/-

(P. M. N. MURTHY)

Chief Commissioner of Railway Safety



APPENDIX A-1

LIST OF NEW RAILWAY LINES, DOUBLINGS, DIVERSIONS ETC. INSPECTED AND AUTHORISED DURING 1978-79

Sl. No.	Kms.
<i>New Lines :—</i>	
1 Bagaha to Valmiki Nagar, Metre Gauge—North Eastern Railway	9·133
2 Bhaghpur Rd-Shamli Section, Broad Gauge—Northern Railway	55·48
3 Dimapur-Kilipahari, Broad Gauge—South Eastern Railway	12·98
4 Barajamda-Barahi, Broad Gauge—South Eastern Railway	9·447
5 Toranigallu-Ranjit pura, Broad Gauge—South Central Railway	23·02
6 Bina fly over, Broad Gauge—Central Railway	8·52
	118·58
<i>Doubling :—</i>	
1 Badli-Narela Section, Broad Gauge—Northern Railway	12.390
2 Lajpatnagar-Safdaraganj, Broad Gauge—Northern Railway	5·656
3 B.B. Nagar-Bangir, Broad Gauge—South Central Railway (for passenger Traffic)	13·23
4 Mucherial-Godavari Bridge, Broad Gauge—South Central Railway	5·97
5 Isarwara-Nariaoli, Broad Gauge—Central Railway	7.257
	44·503
<i>Diversions :—</i>	
1 Sirpur-Ralepet, Broad Gauge—South Central Railway (passenger traffic)	1·95
<i>Conversions:-</i>	
1 Sonpur-Paleza Ghat. (Metre Gauge to Broad Gauge)—North Eastern Railway	5·50



APPENDIX A-2

NEW TYPES OF LOCOMOTIVES AND OTHER ROLLING STOCK SANCTIONED BY RAILWAY BOARD

Running of, on Central Railway

1. WCAM/1 AC/DC Loco in single headed operation for Mail, Express and Passenger trains in the normal course and Goods trains in an emergency.
2. Double Decker coaches on Bombay-Poona and Kalyan-Manmad sections at maximum speed of 105 Kmph regularly.
3. Track recording car and Track recording-cum-Research Car Unit on the various B. G. Sections of Central Railway at speeds shown in the Joint Safety Certificate.
4. 6 axled B. G. Stub end special wagon on Wadi-Naini route with speed restrictions as specified.

Running of, on South Eastern Railway

5. Single/Double headed WAM 4 B Class AC/MT Electric Loco on Durg-Bilaspur section.

Running of, on North Eastern Railway

6. B.G. Oil tank wagon BTO on Barauni-Soapur B.G. Section.

Running of, on Southern Railway

7. B. G. 25 KV/AC EMU Stock on various stipulated sections.
8. M. G. Milk Van type VVN on Madras-Madurai Section.
9. B. G. 120 tonne special type bogie Well Wagon on various stipulated sections.
10. M. G. Milk Van type VVN on various stipulated M. G. sections.

Running of, on South Central Railway

11. B. G. Track Recording Research Car Unit on various stipulated sections subject to stipulated conditions.
12. 100 tonne 8 axle B. G. bogie flat wagon for ODC on various stipulated B. G. sections.
13. B. G. ISO Series-I container loaded on Bogie container flat type BFKX wagon on stipulated B. G. sections.
14. M. G. Milk Van type VVN on Secunderabad-Kurnool Town section.

Running of, on Western Railway

15. Bogie 2nd Class Sleeper with luggage and Brake Van (WGSCNLR).
16. FW Oil tank wagon (TOHT).
17. FW Military open wagon (OM/KM).
18. Bogie open Military wagon for Military use (MBWAX 'A' MBFU).

Running of, on Northern Railway

19. 20.32 tonne axle load B. G. Bogie and Oil tank type 'BTO'.

20. 6 axled B. G. stub end Wagon on Naini-Mughalsarai-Phulpur section.

21. Mobile diesel generating set between Varanasi and Lucknow.

NEW TYPES OF LOCOMOTIVES AND OTHER ROLLING STOCK SANCTIONED BY ADDITIONAL COMMISSIONERS OF RAILWAY SAFETY

Running of, on Central Railway

1. WDM-2 Loco on Diva-Apta section for trial.
2. Locomotives and rolling stock on Ghoradongri-Sarni New Railway siding.
3. ZE Class loco on Pandharpur-Miraj and Barsi Town-Latur N. G. sections.
4. Special test train on Bombay V. T.-Pune section at 120 Kmph.
5. Track Recording-cum-Research Car Unit to RDSO's modification on Pune-Wadi section at 100 Kmph.

6. Bogie Ammonia tank wagon subject to the conditions stipulated on specified B. G. sections.

7. Special wagon of 20 tonne axle load subject to conditions stipulated on specified B. G. sections.

8. BVZT wagon at maximum speed of 110 Kmph on Itarsi-Naini section for oscillation tests.

9. Container flat BFKX on Bombay-Itarsi section.

10. B. G. Bogie oil tank wagon BTO subject to stipulated conditions on Pune-Wadi section.

11. Milk tank wagon on various sections on Central Rly. at 100 Kmph.

12. BTO Bogie oil tank wagon at 110/85 Kmph on Itarsi-Bhusawal section for oscillation tests.

Running of, on South Eastern Railway

13. WDS-8 Diesel Electric Loco on South Eastern Railway.
14. Single/Double headed WDS-4/WDS-4A Loco on Kotavalasa-Kirandul section.
15. 115 tonne diesel electric locos between Rourkela and Tatanagar.
16. WAM 4 B Loco on various sections of South Eastern Railway.

17. Bogie covered wagon BCX Mk. II on Super Parcel Express on Howrah-Waltair section.

18. 24 axle 250 tonne B. G. special wagon over South Eastern Railway.

19. 24 axle 300 tonne B. G. special wagon over South Eastern Railway.

20. NOL and NCL type of wagons on Raipur-Dhamtari section regularly.

Running of, on Eastern Railway

21. HPS-1 Loco, engine foremost and tender foremost over Dildarnagar-Tarighat Branch line.

22. WM of group 'B', HPS-1, WP, WT, WG, WDM-2, WAM-1, WAM-2, WAM-3 and EMU/Push Pull locomotives over Dum Dumi Dankuni Jn.

23. WDM-1 and WDM-2 locomotives over Dankuni Link.

24. WDS-4, WDS-4A & WDS-4B Diesel Hydraulic Locomotives in coupled operation over specified sections.

25. 182 tonne BWZ B. G. Special wagon over certain specified sections.

26. 182 BWZ B. G. special wagon over certain specified sections.

27. "VVN" type B. G. Bogie Milk Van over specified section.

28. 10 tonne B. G. Diesel Crane in regular break down service over specified sections.

29. 75 tonne steam B. D. Crane in regular service over specified sections.

Running of, on Northern Railway

30. High Speed train at 100 Kmph for trial purposes between Sitapur and Lakhimpur M. G. section.

Running of, on Southern Railway

31. Various Classes of engine on Olavakkot-Palghat B. G. section subject to stipulated conditions.

32. B. G. Double Decker coach on Ernakulam-Quilon-Trivandrum section.

33. Prototype B. G. double decker coach on Vijaywada-Kottapalam section subject to stipulated conditions.

34. B. G. Double decker coach on Pune-Miraj section at 100 Kmph subject to restrictions.

Running of, on South Central Railway

35. B. G. oil bogie tank wagon on various sections subject to stipulated conditions.

36. 12 axle B. G. 224 tonne wagon on various stipulated sections subject to stipulated conditions.

37. 182 tonne B. G. special wagon type BWZ on Vikarabad Parli-Vaijnath section.

38. 120 tonne special type bogie wagon on Wadi-Renugunta-Gudur B. G. section.

39. M. G. 4 Wheeler wagon with axle loads upto 2.2 tonnes on Mudkhed-Adilabad section.

40. 10 tonne B. G. steam crane on various stipulated sections subject to stipulated conditions.

Running of, on Northern Railway

41. W. G. locomotives on Shikohabad-Farrukhabad section.

42. Single-headed WDM-2/WDM-4 locomotives on Moghal Sarai-Lucknow-Saharanpur-Pathankot section on trial.

43. WDM-1 locomotive on Shikohabad-Farrukhabad section.

44. WDM-2 locomotive on Shikohabad-Farrukhabad section.

45. WDM-4 locomotive on Shikohabad-Farrukhabad section.

46. WM-Locomotive on Lucknow-Faizabad-Varanasi-Lucknow-Saharanpur sections.

47. Prototype high speed bogie with WDM-4 locomotive super-structure on Allahabad Division for oscillation trial.

48. WDM-2/WDM-3 locomotives at 110 Kmph on Ghaziabad-Delhi section.

49. Prototype B. G. double-deck coach on 10 specified sections.

50. Prototype B. G. double-deck coach on 5 specified sections.

51. Prototype B. G. double-deck coach on Hapur-Moradabad section.

52. Prototype B. G. double-deck coach on 5 specified sections.

53. Track Recording-cum-Research Car on Mughal Sarai-Pratapgarh-Lucknow section.

54. B.F.K. container wagon on specified sections.

55. Bogie container flat type BFKX.

56. M. G. bogie Milk tank type VVN at increased speed-75 Kmph.

57. 90 tonne wagon type BMS on Ambala-Kalka section.

58. 120 tonne diesel B. G. crane on 6 specified sections

APPENDIX B

LIST OF ACCIDENTS INQUIRED INTO BY OFFICERS OF THE COMMISSION OF RAILWAY SAFETY

Sl. No.	Brief particulars of accident.	Casualties K	I	Damage to assets (Rs.)	Cause
1	Derailment of T 159 Dn Bombay VT-Thane suburban train between Matunga and Sion stations on Central Railway on 7-4-78.	..	6	35,620	Due to cut r brake hanger of leading left-wheels of the 8th coach getting dislodged and obstructing the path of the train.
2	Rear-end collision of 537Dn Churchgate-Virar suburban train and No. 7 Dn Ahmedabad-Janata Exp. between Naigaon and Vasai Road stations on Western Railway on 18-4-78.	31	68	8,28,200	Express train being driven past a blank Automatic Signal at such a speed that did not enable the driver to stop short of obstruction.
3	Collision between 3 Up Assam Mail and dip lorry at Salmari Station on North East Frontier Railway on 23-4-78.	..	20	4,68,000	Running into a heavily loaded dip lorry on the track.
4	Fire in 286 Dn Shahaganj Mau Passenger between Khurahat and Mau stations on North-Eastern Railway on 11-5-78.	9	24	1,00,000	The cause is under Government's consideration.
5	Rearend collision of Light engine No. 281823 WCAMI with 42 Up Viramgam Passenger at Valsad station on Western Railway on 22-5-78.	..	3	41,100	Light engine having been driven without due care and shunting not supervised.
6	Derailment of 26 Up Airconditioned Exp. at Dahanu Rd. station on Western Railway on 24-5-1978.	1	3	6,24,853	Could not be established.
7	Derailment of 328 Dn Danapur-Howrah fast passenger between Athmigola and Barh on Eastern Railway on 28-5-78.	10	26	2,45,200	Probably due to spread of gauge due to missing/slack track fittings. This is however, under Government's consideration.
8	Collision between 74 Dn Parcel Exp. and road vehicle at Level crossing No. 342-B between Bilpur and Miranpur Katra stations on Northern Railway on 26-6-78.	22	43	350	Level crossing gates kept open in the face of the approaching train.
9	Derailment of 47 Up Trivanium Central-Cannanore Exp. between Kuruppantara and Piravam Rd. stations on Southern Railway on 1-8-78.	..	23	80,000	Deliberate tampering of the track by unknown persons.
10	Collision between T83 Dn Bombay VT-Thane suburban train and C-39 Dn Bombay VT-Kurla suburban train between Masjid and Sandhurst Rd. stations on Central Railway on 7-8-78.	..	18	7,51,500	T83 Dn train being pushed back into the section in rear which was occupied by No. C-39 Dn local train.
11	Collision between 15 GT Exp. and ran-away BCXT wagon between Tondalagodavaram and Errupalem on South Central Railway on 26-8-78.	2	9	25,29,00	Non-observance of rules while performing shunting.
12	Derailment of train No. 285 Up Passenger between Phariah and Sarai Mir stations on North Eastern Railway on 2-9-78.	5	5	15,300	Fury of nature - storm.
13	Passengers being struck by steel rods bulging out of a wagon on the adjacent line involving 40 Up Ahmedabad-Bombay passenger at Valsad station on Western Railway on 18-9-78.	1	3	Negligible	Steel rods inadequately secured in BFR protruding and intruding adjacent line.
14	Collision between 30 Up Howrah-Bombay Exp. and part load of No. Y 10 Up. Goods train at Asangaon station on Central Railway on 20-9-78.	2	47	13,61,500	Shunting carried out improperly and not in conformity with rules and inability of driver to control the train.
15	Collision between 316 Up Miraj-Pune Passenger train and goods train between Bhavaniagar and Takari on South Central Railway on 11-10-78.	10	35	8,94,281	Goods train passed the Down main line advanced starter at Danger and entered Block section.

Sl. No.	Brief particulars of accident	Casualties		Damage to assets (Rs.)	Cause
		K	I		
16	Derailment of 1 Up Howrah-Delhi-Kalka mail between Baruipara and Kamarkundu stations on Eastern Railway on 4-11-78.	..	..	5,38,250	Unauthorised interference with track.
17	Collision between 47 Up suburban train and 562 Up passenger between Malkajgiri and Secunderabad stations on South Central Railway on 6-11-78.	..	5	78,250	Non-observance of caution after passing signal 43 at Danger.
18	Rear-end collision between Dn Durgapur Special and Dn Asansol Sp. goods trains between Rajkharsawan and Mahali Marup stations on South Eastern Railway on 1-12-78.	1	2	1,12,250	Inadequate caution after passing automatic signal AS 32 at Danger.
19	Derailment of 17 Up Sawai-Madhopur-Loharu Exp. between Jhunjhunu and Ratanshahr stations on Western Railway on 3-12-78.	..	..	42,200	Unauthorised interference with track.
20	Derailment of 136 Up Vaigai Express at Tiruchirapalli station on Southern Railway on 22-12-78	..	1	15,480	Reversal of points when the train was passing.
21	Collision between 57 Saptagiri Express and Shunting engine coupled with 2 coaches at Tirupati on South Central Railway on 30-12-78.	..	11	80,050	Wrong admission of 57 Exp. on occupied line.
22	Side collision between 4 KL Up fast passenger and motor truck between Mahisgaon and Shendri stations on Central Railway on 24-1-79.	..	1	1,200	Fouling of track by a road vehicle.
23	Collision between 10 Dn. Arunachal Fast Pass. and road vehicle at level crossing No. RM 1 at Rangiya station yard on North East Frontier Railway on 28-1-79.	2 (bus 9 (1 pass.) train pass. & 8 Bus pas.)	14	2,850	Negligent driving by bus driver.
24	Derailment of No. 380 Up Quilon-Kottayam Pass. between Quilon and Perinad stations on Southern Railway on 2-2-79.	2	14	3,27,000	Defects in locomotive and track.
25	Fire in 37 Up Exp. between Alamanda & Kantakapalli stations on South Eastern Railway on 2-3-1979.	..	8	650	Live cinders from WP locomotive hauling the train igniting the dry wooden frame of the coach. This is however under Govt's consideration.
26	Collision between 49 Up Exp. train and Food-grain Special at Jandiala station on Northern Railway on 9-3-79.	3	28	33,98,000	49 Express passing signals at danger.
27	Derailment of No. 171 Dn. Jammu Tawi Exp. at Makarpura station on Western Railway on 12-3-79.	..	19	9,66,500	Report awaited.
28	Derailment of 104 Dn. Delhi-Howrah AC Express in Saktigarh station on Eastern Railway on 24-3-79.	..	..	4,00,000	Unauthorised tampering with track.
TOTAL.		. 101	431	1,40,37,594	

APPENDIX B 1

LIST OF ACCIDENTS ENTRUSTED TO RAILWAY ADMINISTRATIONS FOR ENQUIRING UNDER RULE 2(5)(e) OF THE STATUTORY RULES

Brief description of the accident	Casualties K I	Damage to Rly assets	Cause
1 Derailment of No. 23 Dn Exp. at Chitteri, Southern Railway on 12-4-78.	.. 6	3,47,867	Due to buckling of short stretch of track of free rails on wooden sleeper on a $1\frac{1}{2}$ ° curve sandwiched between rigid points and crossings and welded track.
2 Bumping of through service bogies in rear of 23 Dn. Patna-Ranchi/Hatia Express at Gomoh station of Eastern Railway on 4-10-78.	.. 3 (1 grievous)	96,000	Excessive shunting speed and other lapses.
3 Derailment of No. 44 Up Kakinada-Madras Beach Cicular Express Between Ramavarappadu and Vijayawada stations, South Central Railway on 3-11-78.	.. 1 (grievous)	18,021	Due to a combination of a defect on het wheel flange and excessive cross-level variation under dynamic conditions.
4 Side-collision between 142 Dn. Coromandel Express and Up coupled Steam Engine at Waltair station on 12-1-79.	.. 1 (grievous)	86,625	Up leading Steam Engine being driven past Up Home Signal at Danger.



APPENDIX C

COMPARATIVE POSITION OF SERIOUS ACCIDENTS INQUIRED INTO BY THE COMMISSION

Year	No. of inquiries.	Casualties		Damage to Railway Assets	Total for 10 years period . . .				
		Killed	Injured		219	982	3,472	4,37,89,233	
1968-69	.	18	121	501	35,01,525				
1969-70	.	16	192	451	40,61,542				
1970-71	.	20	34	408	30,81,576				
1971-72	.	18	62	287	18,59,731				
1972-73	.	14	36	229	12,90,420				
1973-74	.	21	106	360	41,41,633				
1974-75	.	25	142	201	24,32,028				
1975-76	.	30	54	271	29,02,495				
1976-77	.	30	106	445	77,31,334				
1977-78	.	27	129	319	1,27,86,949				
<i>Yearly</i>									
Average of 10 years period '68-69 to '77-78 . . .									
					22	98	348	43,78,920	
<hr/>									
1978-79 . . .									
					28	101	431	1,40,37,594	



APPENDIX D

SERIOUS ACCIDENTS INQUIRED INTO BY THE COMMISSION UNDER MAIN CATEGORIES

Nature of accident	1968-69 to 1977-78	1978-79
Collisions in station yard . . .	50	5
Collisions in mid-section . . .	13	2
Collisions in Automatic signalling section	13	4
Derailments	65	11
Collisions at Level Crossings . . .	30	2
Fires in train	22	2
Miscellaneous	25	2



APPENDIX E

ACCIDENTS FALLING UNDER SECTION 83 OF INDIAN RAILWAYS ACT IN WHICH INQUIRY WAS CONDUCTED BY THE RAILWAY ADMINI- STRATIONS DURING 1978-79

	Central Railway	Eastern Railway	Northern Railway	North Eastern Railway	North- East Frontier Railway	Southern Railway	South Central Railway	South Eastern Railway	Western Railway	Total	
1. Derailments	.	37	26	28	25	27	26	32	47	26	274
2. Collisions	.	8	6	6	4	2	..	6	4	6	42
3. Fire in Trains	.	5	..	3	1	..	..	..	2	..	11
4. Level Crossing	.	8	1	13	14	6	11	4	9	18	84
5. Other Accidents	.	18	..	4	6	23	..	2	..	..	53
TOTAL	.	76	33	54	50	58	37	44	62	50	464



APPENDIX F

SYNOPSIS OF A FEW ACCIDENTS REPORTABLE UNDER SECTION 83 OF THE INDIAN RAILWAYS ACT INTO WHICH DEPARTMENTAL INQUIRIES WERE HELD BY COMMITTEE OF RAILWAY OFFICERS IN THE YEAR 1978-79

NOTE.—The “Brief description and cause” in Col. 3 are described as below :—

- (a) date of accident
- (b) train or trains involved
- (c) location
- (d) nature of accident
- (e) cause

Legend:—R. S. Rolling Stock; P.W. : Permanent Way; Sign. : Signalling installations; Pass : Passenger train.

Sl. No.	Railway	Brief description and cause	Casualties		Cost of damage	Recommendations
			Killed	Injured		
1	2	3	4	5	6	
1	W.R.	<ul style="list-style-type: none"> (a) 21-4-1978 (b) No. B 120 Up (c) Bandra & Mahim (d) Derailment. (e) Working out of the left-hand hanger pin of the wheel causing the bar to rest on safety brackets. 	Nil		Rs. S. 250 P. R. 6,800 Sign. 32,000	
2	N.R.	<ul style="list-style-type: none"> (a) 24-4-1978. (b) 98 Dn Express to Jodhpur. (c) Salawas station. (d) Derailment. (e) Breakage of axle of the leading wheel. 	Nil		6,190	
3	N.R.	<ul style="list-style-type: none"> (a) 30-4-1978. (b) 239 Up Pass. to Palanpur. (c) At Level Crossing between Jari & Dhanera stations. (d) Derailment. (e) Non-observance of traffic rules by the tractor-driver. 	..	6	..	
4	E.R.	<ul style="list-style-type: none"> (a) 1-5-1978 (b) 101 Up Rajdhani Express. (c) Rajbandh & Durgapur. (d) Derailment. (e) Breakage of axle. 	Nil		5,000	
5	S.C.	<ul style="list-style-type: none"> (a) 5-5-1978. (b) 227 Up Guntur-Gadag Pass. (c) At Km. 306/3-2 between Linganenidoddi & Pendakallu stations. (d) Derailment. (e) Breakage of axle. 	Nil		800	
6	S.C.	<ul style="list-style-type: none"> (a) 10-5-1978. (b) 554 Up Passenger. (c) Poodoor station. (d) Derailment. (e) Breakage of left leading axle of the leading trolley. 	Nil		Nil	

1	2	3	4	5	6
7 W.R.	.	(a) 10-5-1978. (b) Dn. Gujarat Express. (c) Between Miyagam & Palej. (d) Derailment. (e) Mis-alignment of the portion of track.	..	Engine 500 R.S. 35,000 P.W. 25,000	
8 S.E.	.	(a) 29-5-1978. (b) S.S./220 double-headed engine. (c) Dhallirajahara. (d) Derailment (e) Due to non-control and excess speed of the train.	Nil	2,60,000	
9 S.C.	.	(a) 2-6-1978. (b) 209 Up Londa-Miraj Pass. (c) At Km. 588/14. (d) Derailment. (e) Sudden breakage of the axle of the leading wheel of the trailing truck of the coach.	Nil	7,500	Ultrasonic testing of axle of coaching stock in the depots at appropriate intervals may be introduced for timely detection of any possible development of cracks on axles during Service between two periodical overhauls.
10 S.R.	.	(a) 24-6-1978. (b) 678 Dn. Tiruchi Manamadurai Pass. (c) Vellanur Station. (d) Derailment. (e) Defects in the engine combined with excessive speed.	Nil	8,000	
11 N.R.	.	(a) 26-6-1978. (b) 120 Dn. Gomti Express. (c) Between Sarai Bhopat & Etawah. (d) Derailment. (e) Due to the leading bogie left trailing wheel of the coach having worked out from its axle as the axle seat had become loose.	Nil	500	
12 S.R.	.	(a) 28-6-1978. (b) 99 Up Bangalore City-Dharmavaram Express. (c) At Km. 58/8-9 between Maklidurg & Tondebhavi stations. (d) Derailment. (e) Due to the breakage of the leading bogie trailing axle of the derailed coach.	Nil	25,000	
13 W.R.	.	(a) 3-7-1978. (b) 240 Up Mixed train. (c) Unai and Anaval. (d) Derailment. (e) The entire wheel flange had separated in the form of a ring at the root of the flange owing to excessive grooving of the glut ring.	Nil	R.S. 100 P.W. 200	
14 S.E.	.	(a) 15-7-1978. (b) Bogie No. SE 5118 GS 1 in electric 144 A Dn. Puri Express. (c) At Km. 166/4-2 (from Howrah). (d) Derailment. (e) Due to droppage of 3 auxiliary vacuum chambers.	Nil	37,000	

1	2	3	4	5	6
15	N.R.	(a) 17-8-1978. (b) 97 Up Jodhpur-Barmer Express. (c) Baniya Sanda Dhora and Kavas. (d) Derailment. (e) Breakage of rear axle.	Nil	605	
16	N.R.	(a) 21-8-1978. (b) 9 Up Dehra Dun Express. (c) Dilawar Nagar & Malihabad. (d) Derailment. (e) Breakage of the leading axle of the trolley.	Nil	98,050	
17	S.R.	(a) 8-9-1978. (b) 3616 Up Goods train. (c) Silakkudi station. (d) Derailment. (e) Driver passing signal at 'ON' due to inadequate break-power.	1	3,27,380	At Kallakudi-Pallangnattham the train examination advice in form T 1102 is not being used to advise the train examining staff regarding the formation being ready for examination and requiring them to examine the same. Presumably, this is due to there being no train examiner and also the number of trains being very much limited. With immediate effect this form should be used advising the train examining staff regarding formation being ready for examination so that it could be ensured that a competent person is examining and surveying the train.
18	N.R.	(a) 12-9-1978. (b) Dn. empty PUC special. (c) Budhlada and Baretta. (d) Derailment. (e) Falling of the buffer on the track.	3	2	2,681
19	S.R.	(a) 14-9-1978 (b) 549 Dn. Mixed train to Salem. (c) At Km. 20/10-11 between Mecheri Road and Tolasampatti stations. (d) Derailment. (e) Missing of the securing bolts of the front truck to the yoke of the engine.	Nil	12,340	
20	S.C.	(a) 14-9-1978. (b) 14 Falaknuma-Bolarum Suburban train. (c) Sitapalmandi. (d) Derailment. (e) Breakage of axle.	Nil	Nil	
21	S.R.	(a) 28-9-1978. (b) 269 Up Mangalore-Subramanya Rd. Pass. (c) Point No. 104 (mixed gauge at Kankanadi station). (d) Derailment. (e) Sudden breakage of the left pony back spring hanger.	Nil	88	The S.T. class locos have completed 40 yrs. of intensive service since placed on line. The pony and coupled spring hangers would thus have become very old needing replacement. It is therefore suggested that during p.o.h. the old pony and cable spring hangers for once are replaced with new one so as to give another lease of life for these important components.



1	2	3	4	5	6
22	N.R.	(a) 21-10-1978. (b) 355 Up Agra-Barreily Pass. (c) Dabtara station. (d) Derailment. (e) Tampering of vacuum disc of rake.	Nil	4,000	
23	S.R.	(a) 3-11-1978. (b) 44 Up Kakinada Port Madras Beach Circar Train. (c) Vijaywada station. (d) Derailment. (e) Defect on the wheel flange of the engine.	Nil 1	18,021	
24	S.R.	(a) 4-11-1978. (b) 92 Up Raichur-Madras Central Passenger. (c) Kosgi station. (d) Derailment. (e) Due to the brake truss beam working loose and entangling with point No. 8.	Nil	37,000	All passenger-carrying trains should be provided with portable telephones. The S.S. of the guards' headquarter station should maintain proper account of such equipment unloaded and loaded and any shortfall or non-return of such equipment should be promptly reported and taken up.
25	S.E.	(a) 5-12-1978. (b) DD/148 Dn. Goods train. (c) At Km. 209/9-8 between Malligura and Jarati stations. (d) Derailment. (e) Due to spread gauge under dynamic conditions leading to the dropping of vehicle.	Nil	1,27,000	
26	S.R.	(a) 5-12-1978. (b) 199 Dn. Tirupathi East Villupuram Exp. (c) At Km. 129/10-9 at Kannamangalam station. (d) Derailment between Kuttakudi and Akkiravari stations. (e) Excessive speed.	Nil	37,588	
27	S.R.	(a) 7-12-1978. (b) 130 Up. Tiruppappu liyur Salem Pass. (c) At Km. 84/10-11 between Kuttakudi and Pukkiravari. (d) Derailment. (e) Excessive cross level variations.	Nil	10,000	
28	S.C.	(a) 28-12-1978. (b) 120 SO 2 Singerani-Karepalli goods train. (c) Between Singerani collieries and Karepalli stations. (d) Derailment. (e) Driver passed signals at danger at excessive speed.	8 3 Unauthorised persons.	6,25,700	
29	S.E.	(a) 29-12-1978. (b) 69 Up Bokaro Madras Express. (c) At Km. 345/1 near Muri. (d) Derailment. (e) Dropping of right-side buffer plunger of the locomotive tender.	Nil	9,700	

1	2	3	4	5	6
30	S.C.	<ul style="list-style-type: none"> . (a) 1-1-1979. (b) 563 Dn. Kacheguda-Manmad Pass. (c) Between Karmad and Chikalthane stations. (d) Derailment. (e) Due to dropping off adjusting rod bolt and the loose adjusting rod striking the safety cover of points No. 10 causing obstruction. 	Nil	735	
31	S.E..	<ul style="list-style-type: none"> . (a) 22-1-1979. (b) Nimpura Shuttle goods Up & 3 Up Howrah-Madras Mail. (c) Points No. W/46 at Kharagpur. (d) Collision. (e) Deficiency of the CBC yoke at Nimpura end. 	Nil	10,000	
32	S.C.	<ul style="list-style-type: none"> . (a) 23-1-1979. (b) 483 Dn. Guntur-Machilipatnam Pass. (c) Nidamanaru station. (d) Derailment. (e) The long pull-rod of the leading bogie of tender was not secure. 	Nil	12,459.1	
33	S.E..	<ul style="list-style-type: none"> . (a) 27-1-1979. (b) Dn. Extra KOT-1. (c) Slip siding points at Km. 32/8. (d) Derailment. (e) Sharp flange of the wagon; overloading of BOY wagons by NMDC & driver exceeding the permissible speed. 	Nil	10,53,000	
34	W.R.	<ul style="list-style-type: none"> . (a) 6-2-1979. (b) 57 Up Fast Passenger to Ahmedabad (c) Unmanned Gate No. 10C between Dabdhoda & Nareda. (d) Collision with road vehicle at unmanned crossing. (e) Failure of truck driver in observing rules for crossing the unmanned level crossing gate. 	R.S. 2,200 1 8 Engine 1,666 (Truck)(4 passengers and 4 others)		
35	S.C.	<ul style="list-style-type: none"> . (a) 14-2-1979. (b) 581 Up Ajmer-Kacheguda Pass. (c) Chudawa station. (d) Derailment. (e) Breakage of axle. 	Nil	Nil	
36	S.C.	<ul style="list-style-type: none"> . (a) 26-2-1979. (b) 227 Up Guntur-Gadag Pass. (c) At Km. 297/7-6 between Pendakallu and Edduladoddi stations. (d) Derailment. (e) Cold Breakage of the leading axle of the trailing trolley. 	Nil	1,616	
37	N.F.	<ul style="list-style-type: none"> . (a) 8-3-1979. (b) 17 Dn. Vaishalli Express & Parted load of 711 Up KVS goods. (c) Barsoi & Mukuria stations. (d) Collision. (e) Not verifying complete arrival of 711 Up and permitting 17 Dn. to enter Block Section while parted portion of 711 Up remained in the section. 	Nil 5	46,352	

Abbreviations : NR — Northern Railway; WR — Western Railway; ER — Eastern Railway;
 SE — South Eastern Railway; NF — Northeast Frontier Railway;
 SC — South Central Railway.

APPENDIX G

ACCIDENTS UNDER SECTION 83 CATEGORY & RAILWAY-WISE FOR FOUR YEARS, 1975-79

Railways		Collisions	Derailments	L-xing	Fire	Misc.	Total
Central	75-76	2	23	5	..	..	30
	76-77	5	19	3	2	..	29
	77-78	3	28	4	3	..	38
	78-79	8	37	8	5	18	76
Eastern	75-76	10	18	4	1	1	34
	76-77	5	16	2	1	..	24
	77-78	9	17	2	..	2	30
	78-79	6	26	1	..	..	33
Northern	75-76	8	22	22	3	1	56
	76-77	2	25	7	2	..	36
	77-78	7	24	23	..	..	54
	78-79	6	28	13	3	4	54
North-Eastern	75-76	4	27	17	3	..	51
	76-77	2	23	16	3	..	44
	77-78	..	18	12	..	..	30
	78-79	4	25	14	1	6	50
Northeast Frontier	75-76	..	14	12	..	..	26
	76-77	1	17	8	..	..	26
	77-78	1	19	3	1	..	24
	78-79	2	27	6	..	23	58
Southern	75-76	..	25	8	..	2	35
	76-77	5	24	8	..	..	37
	77-78	4	19	12	..	..	35
	78-79	..	26	11	..	..	37
South-Central	75-76	1	38	6	1	1	47
	76-77	3	21	9	3	2	38
	77-78	4	30	14	1	..	49
	78-79	6	32	4	..	2	44
South Eastern	75-76	8	23	8	2	6	47
	76-77	4	31	14	1	..	50
	77-78	8	57	13	4	5	87
	78-79	4	47	9	2	..	62
Western	75-76	3	26	10	4	6	49
	76-77	5	15	7	4	4	35
	77-78	2	37	14	1	1	55
	78-79	6	26	18	..	..	50

APPENDIX H

ACCIDENTS UNDER SECTION 83 INVOLVING WHEEL AND AXLE DEFECTS 1977-78 & 1978-79

Sl. No.	Date	Brief description	Cause
1	16-4-77	Derailment of SLR 16 Dn. between Nunkhera & Bhatni Jn. stations, N. Rly.	Due to breakage of axle and wheel No. 2 of SLR 2509.
2	17-5-77	Derailment of DK 236 Dn. coach No. 10413 between Dankuni & C.O. Link, West Cabin, E. Rly.	Bursting of wheel tyre-failure of tyre mater.
3	10-8-77	Derailment of 3rd bogie of 98 Up Venkatadri Exp. at Guntakal, S. Rly.	Defect in the wheel gauge of leading wheel of the trailing bogie.
4	16-11-77	Derailment of 4 AJL Pass. at Hamira station, N. Rly.	Due to front bogie left-side wheel tyre worked out.
5	11-12-77	Derailment of leading bogie of coach No. 1045 of N. 63 Up between Dum-Dum and Dalghand, E. Rly.	Due to bursting of wheel tyre into 3 pieces.
6	24-4-78	Derailment of 98 Dn Exp. at Salawas station, N. Rly.	Due to breakage of the axle of the leading wheel.
7	1-5-78	Derailment of 101 Up RAJDHANI EXP. between Rajbandh & Durgapur, E. Rly.	Due to breakage of axle.
8	5-5-78	Derailment of coach of 227 Up Pass. train near Pan-dakallu station, S.C. Rly.	Due to breakage of axle at the point of an old fracture.
9	10-5-78	Derailment of 5th coach of 554 Up Pass. between Dronachalam and Secunderabad, S.C. Rly.	Due to breakage of left leading axle of the leading trolley.
10	2-6-78	Derailment of 4th bogie of 209 Up Pass. between Khanapur & Desur stations, S.C. Rly.	Due to breakage of the axle of trailing bogie of the coach.
11	26-6-78	Derailment of one bogie of 120 Dn. GOMTI EXP. between Sarai Bhopat & Etawah stations, N. Rly.	Due to left trailing wheel of leading bogie working out from its axle.
12	28-6-78	Derailment of 99 Up Link Exp. at 58/8 Km between Makkidrug & Thondebhai stations, S. Rly.	Due to the breakage of axle of the leading bogie of the derailed coach.
13	3-7-78	Derailment of 240 Up Mixed train between Unai & Anaval stations, C. Rly.	Due to separation of the entire wheel flange in the form of a ring.
14	17-8-78	Derailment of 97 Up at Baniasanda Dhora, N. Rly.	Due to breakage of rear axle.
15	21-8-78	Derailment of 9 Up between Dilawarnagar and Malihabad, N. Rly.	Due to breakage of leading axle of the trolley.
16	19-9-78	Derailment of 14 Falaknuma-Bolarum suburban train at Sitapalmandi, S.C. Rly.	Due to breakage of axle.
17	14-2-79	Derailment of 581 Up Pass. at Chudawa station, S.C. Rly.	Due to breakage of axle.
18	26-2-79	Derailment of 227 Up Pass. at Km. 297/7, S.C. Rly.	Due to breakage of the leading axle of the trailing trolley.

Abbreviations :—

C. Rly. :—Central Railway;
 E. Rly. :—Eastern Railway.
 S. Rly.—Southern Railway;
 N. Rly.—Northern Railway.
 NE. Rly.—North Eastern Railway.
 SC. Rly.—South Central Railway.



सत्यमेव जयते